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THE MEDICAL JOURNAL OF AUSTRALIA.

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THE PATHOLOGY OF FUNCTIONAL NERVOUS DISORDERS.[1]

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Rational treatment of disease depends upon a knowledge of the causes upon which such diseases are dependent. The present paper is an attempt to explain as concisely as possible a working hypothesis of functional nervous disorders in accordance with our increasing knowledge of psychology and of the physiology of the nervous system.

It is desirable to define at the outset the general views in regard to these disorders. These may be stated as follows:

(*i.*) On the one hand, there is the general lay and even medical opinion that nervous disorders without structural cause are "imaginary." The conception behind the term imagination is "the perverse operation of a force, will-power, of which the patient has full conscious control." The patient is consequently regarded as a more or less deliberate fraud.

On the other hand, psychological medicine maintains that consciousness is an accompaniment of function of living tissue and is not an interacting force in the world of finite matter. This is the generally received doctrine of psycho-physical parallelism.

(*ii.*) On the one hand there is the agnostic opinion that the manifestations of these disorders are not fraudulent, but are arbitrary and unaccountable.

On the other hand psychology is demonstrating that these manifestations, as well as the whims and fancies of normal people, are as definitely determined as the winds, the weather and the other variables of nature.

(*iii.*) On the one hand, the more prevalent opinion is that these disorders are manifestations merely of toxæmias, anæmias, congenital aplasias or dysplasias, etc..

On the other hand psychological medicine takes the view that such processes may act as predisposing cause or links in the chain of a vicious circle, but that the mechanisms of the physiological processes of the nervous system demand an equally important consideration with the more tangible organic disorders.

From an evolutionary point of view the nervous system represents the mechanism whereby the internal activities of a multicellular organism are correlated to react in harmony with the environment. Therefore, nerve fibres and nerve tracts represent, as it were, a crystallization of the lines of interaction between the various functioning tissues within the organism.

The thesis maintained in this paper is that a functional nervous disorder is a sustained disharmonious correlation of functional activity to the reality of environment dependent upon normal neuro-physiological processes operating in a vicious circle.

It is, therefore, necessary that the normal physiology of the nervous system be considered first.

The simplest natural nervous process is the reflex. Even at this stage the most prominent characteristic is co-ordination.

Take, for instance, the Babinski defence reflex. The stimulation produces a contraction of groups of synergic muscles, causing flexion of the hip, knee and ankle and dorsi-flexion of the toes. The stimulus also produces inhibition of tonus, *i.e.*, relaxation of all antagonistic muscle groups. Such co-ordinated action is called purposive and is the expression of a mechanism for withdrawing the limb from harmful stimuli.

The brain of an animal is developed in relation to mechanisms for receiving stimuli from a distance—smell and light and, later, sound. As these stimuli are of great importance to an animal, it must not be impeded in its response to them by reactions to local stimuli of minor importance. Response to distance receptors therefore prevails over other reflex systems, so that in the complete animal somatic reflex systems are only set in operation when local stimuli are prepotent.

Thus a man treading on a tack gives a typical Babinski reflex response, unless he is engaged at the time in a more potent reaction.

In order to investigate the reflexes of the somatic muscular systems, which illustrate the mechanisms of reflex response most clearly, a decerebrate animal must be employed. Sherrington has demonstrated these mechanisms very completely, the following being the principal phenomena. Firstly muscles antagonistic to a reflex response are actually inhibited and not merely passively stretched by the contracting museles.

This principle is demonstrated clinically in any patient with severe lesion of the cord, retaining some voluntary power. When such a patient is in the sitting position, the hamstrings are passively stretched; this leads to inhibition of tonus of the quadriceps, so that full voluntary extension at the knee is impossible, but flexion easy. When the patient is in the supine posture, the quadriceps muscle is passively stretched and the hamstrings inhibited. Full extension at the knee is now easy, but flexion impossible.

Secondly summation of excitation or immediate spinal induction. Two stimuli operating on a common reflex pathway, which are ineffective alone, produce a response when acting simultaneously.

Thirdly the rebound phenomenon or successive spinal induction. A greater response follows immediately after inhibition of tonus produced by stimulation of an antagonistic reflex.

Fourthly algebraic summation of excitation and inhibition produced by simultaneous stimulation of antagonistic reflexes is shown by responses repre-

[1] Read at a Meeting of the South Australian Branch of the British Medical Association on November 25, 1920.

senting a compromise of plus and minus influences on each affected muscle.

Fifthly the alternating response may result when two antagonistic reflexes are simultaneously and equally stimulated. This response shows a possible variation from algebraic summation.

Sixthly there may be absence of change of response when place and rate of stimulation are changed. The momentum, as it were, of the original response continues the type of the reaction. This again represents a possible variation from algebraic summation.

Reflexes in the vegetative system have been worked out by numerous experimenters. This system varies from the somatic system in that the influence of the brain in the resting condition is practically negligible and in that mutually antagonistic system of innervation, cranio-sacral and sympathetic respectively, are present.

The same phenomena of co-ordination of excitation and inhibition and algebraic summation of excitation and inhibition have been clearly demonstrated in heart muscle, vascular system, digestive tract, secretions, reproductive systems, etc..

These observations clearly show that the reflex mechanisms of the nervous system are so organized that any single stimulus produces a co-ordinated purposive response by central processes of excitation and inhibition in the nervous pathways, if the stimulus is of effective intensity. When the stimulus is subliminal, processes of facilitation and inhibition are produced in the same pathways. When, however, more than one stimulus affects any one pathway, the result is a compromise effect and, in the absence of a higher co-ordinating system, the response is apt to be incoordinated and non-purposive. Under these circumstances a temporary functional disability is exhibited.

So far we have considered reflex mechanisms which essentially represent means of co-ordinated responses of local sign limited to a portion only of the functioning tissues of an organism.

But now let us turn to the consideration of mechanisms whereby the animal reacts as a whole and all activities become subservient to a co-ordinated purposive response to an effective stimulation of distance receptors or a prepotent stimulation of local receptors.

Such mechanisms are now being recognized to be the bases of the physiological processes accompanying the conscious state spoken of as an emotion. To such a co-ordinated purposive response the term emotional response will therefore be given.

The significance of this conception of emotion will be seen in comparative physiology.

The leech and the crayfish, for example, exhibit strong "emotional" responses, which we recognize as emotional even though we have no conception of the accompanying conscious state.

The flickering flagellation of some amœbæ when resting, which may be considered as a reflex response, ceases when the animal passes into chemio-tactic progression or flight, which corresponds to an emotional response.

Emotional responses have been chiefly studied in higher vertebrate animals. Some examples of the mechanisms involved in emotional responses will make the conception clearer.

Anger represents a co-ordination operating for a maximal external response of aggression. The physiological processes are, broadly speaking, increase of somatic muscular tone with facilitation of muscle action, stimulation of sympathetic system and inhibition of the cranio-sacral system. There is rapid heart beat, there is inhibition of and withdrawal of blood from the digestive and reproductive systems, but not from the heart, brain and lungs, which have little or no sympathetic supply. The muscles and skin are flushed with blood. There is increased adrenalin in the blood, increase of sugar in the blood and the coagulability of the blood is increased, dilatation of the nares, relaxation of the larynx and bronchioles, increased depth and frequency of respiration, horripilation, retraction of lips from teeth, dilatation of the pupils and laying back of ears. The purposive nature of such a co-ordination of functional activity is most complete.

Grief is accompanied by physiological effects almost completely opposite to those of anger. Decrease of skeletal muscle tone, cranio-sacral excitation and sympathetic inhibition. These signs are accompanied by a slow heart, a feeble circulation, cold skin, slow, shallow breathing with spasticity of the laryngeal muscles and of the digestive tract. There is co-ordination purposive of mimimal external response and closest identification with death.

Fear exhibits much the same bodily effects as anger, but there is an inhibition of sympathetic action on the urinary and intestinal sphincters. The animal is co-ordinated for maximal effort in flight and at the same time voids urine and fæces which may distract the attention of the pursuer.

Terror represents a general inhibition of internal and external response and simulation of death.

Shame exhibits partial inhibition of somatic muscle tonus and of inhibition of cardiac and vascular tonus, etc., appropriate to inconspicuous withdrawal after defeat.

Similarly erotic emotion has its appropriate co-ordinations. Hunger represents an irradiation from the deglutition reflex, becoming a generalized co-ordinated activity.

Disgust represents a general co-ordination centred on the vomiting reflex.

Curiosity at basis is a derivative of emotion of hunger, nutritive or sexual.

Pride, joy, content, happiness, pleasure and "tender" emotions represent the aftermaths of the successful carying out of other emotional responses or important reflex responses. They are associated with a generally increased tonic activity dependent upon residual excitation and rebound from previous inhibitions of the preceding emotional or reflex responses. The more unpleasant the primary emotional status, the greater is the rebound to the pleasurable aftermath.

Pain represents a generalized irradiation of nervous impulses upon failure of purposive action of

primary reflex or emotional response whereby the originating stimulus becomes so sustained as to endanger the organism. This generalized irradiation causes stimulation of sympathetic, inhibition of cranio-sacral systems and more or less purposive reactions of somatic systems. Pain, therefore, corresponds to the definition of an emotional response. Considered from this aspect the phenomenon of pain opens up interesting avenues of thought.

Most reflex and emotional responses concern the individual alone. The demands of evolution (the pleasure and tender emotions succeeding nutritive reflex and erotic emotion) lead to an identification of self-interest of the male and female mate and offspring, so that they react to the environment as a family unit and emotional responses are thereby organized on a wider basis than that of the individual alone.

The family unit may be widened to that of the herd or pack in animals. In man it has been widened to tribe and nation. Present-day efforts to extend this identification to a brotherhood of man have not yet succeeded.

The conception, which I hope I have made clear by the above examples, is that emotional responses are just as much purposive mechanisms elaborated in the course of evolution as the eye, the ear and the general bodily structure of animals.

In exact conformity with a reflex response, an emotional response is the expression of an organized system of nervous pathways for the transmission of co-ordinated excitatory and inhibitory influences, but on a more complete scale than the reflex mechanism.

When two emotional responses are simultaneously called into action, the usual response, as in the case of the reflex, represents the algebraic sum of excitatory and inhibitory influences of each separate emotion, *e.g.*, when anger and grief, fear and hunger, love and disgust are simultaneously aroused in varying degrees of intensity.

When curiosity and fear are concomitant, an alternating response is particularly apt to be exhibited.

Further, when one emotion is in full operation, a stimulus which would ordinarily arouse another type of emotional response, is apt to be ineffective *e.g.*, an animal when angered is less easily frightened.

The rebound phenomenon has already been illustrated in speaking of pleasure, etc..

It is also illustrated in violence of passage from one emotion to its antagonist, *e.g.*, love and hate, indulgence and remorse.

Summation phenomenon is clearly exhibited by an animal which gives an angry response only after a number of separately ineffective irritations and by the soldier who exhibits fear reactions, *i.e.*, becomes "jumpy," only after a long repetition of individually ineffective stimuli.

Emotional responses, therefore, exhibit all the phenomena that Sherrington has demonstrated for the reflex responses of the decerebrate animal.

Further when two emotional responses are simultaneously excited, common pathways are always involved and the summated result is apt to be non-purposive and mal-adapted. Under the circumstances a temporary functional disability is exhibited.

In primitive animals emotional and reflex responses are uninfluenced by repetition. With higher animals, however, some aftermath of such response remains together with that of the immediately succeeding response. In consequence of this, repetition of the primary emotional response is facilitated or inhibited by the fusing with it of the succeeding response. Thus an animal impelled by curiosity to inspect the novel creature man is liable to alter his future response, according to whether he finds man good to eat or painful to meet. In the first case smell and sight of man come into relation with effective stimuli for operation of emotional response of hunger, in the second case for operation of emotional response of fear.

When experience thus leads to adaptation of an inherited type of response, a new mechanism, that of memory and intelligence, is superimposed upon the reflex and emotional systems.

Pavlov has demonstrated such adaptations experimentally in dogs with gastric and salivary fistula. A dog is fed and at the same time a sensory stimulus is given by sounding a bell, showing a light or stimulating a skin area, even painfully. After continual repetition the sensory stimulus alone will produce the same flow of saliva or gastric juice as the exhibition of food. Pavlov has given the name of "conditioned reflexes" to such phenomena.

A further step in the adaptation of emotional responses is when the memory of witnessed experience of the response of another organism becomes of sufficient intensity to alter the emotional response of the observing individual.

The final step in such adaptation is when communication of precept becomes a factor in modifying response. This we usually consider to be man's prerogative, but there is some evidence for its occurrence in higher insects and vertebrates.

In the process of such adaptations numbers of experiences become associated with several emotions which are simultaneously excited, giving rise to complex emotions or sentiments, such as love, reverence, awe, etc.. Conversely all facts of experience, being associated with emotions and sentiments, draw from such emotions their vividness in reproduction in remembering. Thus we love a certain person and in association with him pleasant memories come readily to mind. If we quarrel violently and come to hate him, then the naturally associated memories are all the previously inhibited memories of unpleasant experiences associated with our hate sentiments.

In the development of the infant to the adult the organization of experience with emotions is indicated by the gradual developement of character. Character signifies a systematization of past experiences with emotional and reflex responses, such that an appropriate response is made to current experiences. As Bergson has enunciated: "A man thinks and acts with his whole past."

To take an example, a child is educated to an emotional response of shame with regard to its excretions. In polite society any reference to such matters is made by a circumlocution; use of direct expression is inhibited by the emotion of shame. To an adult

of such society to have to perform an excretory function in any but an appropriate place is disgusting and painful, *i.e.*, the stimulus to execution must be sufficiently strong to overcome the shame, disgust, inhibition. Finally, to such a person any impulse to use the excreta as playthings is well nigh inconceivable and any such reaction impossible, as the stimulus could never be of sufficient intensity to overcome the inhibitions of character systematization.

Here we see three degrees of solidarity of organization, such that reaction is less and less dependent upon contingent circumstances. These various reactions are, however, all cheerfully carried out by the child and are exhibited in the progressive stages of desystematization of character in dementia.

In this conception of character we have a conception of the mechanism of the Freudian censorship of mental processes. The subjective side of character is termed conscience. Upon this organization of character is dependent the phenomenon of conviction. An experience which is readily assimilated with our existing systematization of previous experience, is treated in a different way to an experience which is, as it were, indigestible. For example, we love someone; we hear of him doing a good action and receive this information with ready conviction; we hear ill of him and do not believe it or, if the evidence be strong, we try to tone down the offence and find excuses for him. On the other hand, we hate someone; we hear good of him and do not believe it readily or, if the evidence be strong, we impute a nasty motive to the action; we hear ill of him and believe it at once and loudly proclaim our conviction.

Again, we read that Carrel has successfully transplanted a limb of a dog and we merely remark on his skill. If, on the other hand, a bushman tells us he has done this same thing to a bullock, we are unconvinced. Again, with exactly the same facts to hand, equally intelligent people hold quite different political and religious convictions.

The corollary is that no matter how improbable or bizarre an idea be in reality, if it is accepted with conviction by an individual, it is a reality to that individual and will modify his conduct accordingly. A conviction, therefore, is an idea which cannot be dissolved by a simple negation, but only by bringing its underlying experiences into relation with a new emotional systematization, *i.e.*, in popular language, by bringing the individual to see the experiences in question from a new standpoint.

With the appearance of the mechanism of memory, with its consequences of systematization of hereditary responses by education, we now find the final mechanism concerned in the formation of a functional nervous disorder, *viz.*, the sustained element in such disorders. So far we have seen that the coincidence of two or more simultaneous reflex or emotional responses could produce a temporary non-purposive and mal-adapted response. In the absence of memory such a disability would be an affair of the moment. When, however, such antagonistic responses are aggregated into an emotional systematization, the maintenance of the inco-ordination by a vicious circle becomes possible and the functional nervous disability may become permanent and progressive.

Thus a horse which has been frequently mishandled, may become a neurotic individual, just as a man who has been subjected to repeated emotional over-stimulation.

Before proceeding to practical examples of functional nervous disorders in man, there are three phenomena of consciousness that require consideration.

When an emotional response or important reflex is inhibited, we experience in consciousness desire, accompanied by various sensations from the uninhibited vegetative and somatic reactions, *e.g.*, restlessness, flushing of the skin, rapid heart, gripping muscles, etc.. The total content of consciousness is summarized under the terms discontent, dissatisfaction or distress, according to the potency of the originating stimulus.

When an emotional excitation leads to a fully adapted motor response, desire is absent from consciousness and the conscious state is that of interest.

Interest is a less intense conscious state than desire. The man absorbed in his work and the soldier charging are in a less intense conscious state than the man hindered in his work and the soldier waiting for the signal to charge. Even grief, which is expressed by loud wailing and sobbing and floods of tears, is less terrible than grief borne in silence.

Where a motor response in conduct is inhibited, an emotional response may result in a stream of conscious imaginary, as in thinking, dreaming, listening or gazing. All thinking is carried on by means of words or other symbols, *e.g.*, mathematics without symbols is impossible. The following is a simple example: A man is given a certain order and his emotional systematization is co-ordinated to refuse the order. He may say: "I will not"; he may indicate the same words by writing them in ordinary characters or code; he may use a pantomimic action, or a mere gesture of refusal; he may simply fail to respond ("the passive resister"); he may pretend in an exaggerated manner not to hear ("the dumb insolence" type of the military); he may avoid the issue by cheerily misunderstanding it and carry out some substituted action; if fully trained in discipline, his response of refusal will be overcome in the main by his stabilized reaction system, but the inhibited response will be indicated by a pained expression or an exaggeratedly formal salute or by an unnecessary spurring of his horse. Translated into terms of psychology, these responses are symbolic expressions of the man's thought.

Yet it is surely more accurate to state that consciousness of such responses, actual or intentional, is the thought itself. Thinking, dreaming, etc., therefore represent an emotional response in which the awakening of visual, auditory or motor-sensory images takes the place of an actual motor response. Uneducated people, children and drunkards speak their thoughts and always read aloud. Deep thinkers are seldom men of action.

This conception that dream states are merely variations of normal thought processes, the symbolism varying from the ordinary symbolism of waking thoughts, is the great discovery of Freud. To put this succinctly an emotion (desire) which does not find direct satisfaction in conduct, obtains fulfilment in symbolic imagery. The fairy story of Cinderella is a

typical dream; the thirsty man dreams of water; the hungry man of food; the boy of pirates; the bereaved of their dead; the sufferer from heart disease expresses his emotion of anxiety in a nightmare of suffocation.

A final phenomenon which I wish to touch, is that of attention. The average man thinks that he can direct his attention at will. But let him try to read a dull book immediately after he has been grossly insulted and he will realize his limitations. Let me take another instance. A man settles down to concentrate his attention on a metal ring. As long as he finds points of interest in its size, colour, irregularities, etc., he can hold his attention on the ring. Once these interests are exhausted, his attention wanders off to some other interest or he falls asleep. Suppose now that the metal ring be the muzzle of a gun in an enemy's hand; he may attempt to divert his interest to the scenery or the latest popular song, but with irresistible force the menacing ring brings his attention back to the overwhelming interest of the moment. Attention in other words is a phenomenon of interest, *i.e.*, of an emotional state.

The converse of attention, *i.e.*, total absence of interest or desire, is the unconscious state of dreamless sleep—a most important fact—and the ideal content or *nirvana* sought by eastern devotees.

Another phenomenon of attention is that sensory stimuli, not in harmony with a prepotent emotional complex in operation, produce little or no response and are barely or not at all represented in consciousness. Thus love is blind to all else but love; a man may be blind with rage or fear; a man bent on revenge is deaf to entreaties; a man with strong convictions is deaf to arguments to the contrary.

In my remarks I have avoided the use of the word "instinct," as there is no unanimous definition of the term. McDougall has propounded an hypothesis according to which an instinct is the physiological nervous reaction underlying any one conscious emotional state. This, however, does not appear to be a satisfactory definition as an instinct, *e.g.*, the instinct of self-preservation, may represent a constellation of all emotional and reflex reactions with the exception of the erotic emotion which frequently leads to the death of the individual. On the other hand,a reflex constellation such as the instinct of man to walk in the erect attitude, has no counterpart as an emotional state in consciousness.

In this paper an emotion is considered to be a type of physiological nervous response with more or less correlation to consciousness and an instinct as an hereditary constellation of emotional or reflex responses.

The only instinct to which I wish to draw attention, is that of imitation, which is a fundamental instinct of the emotional identification of the family, pack or tribe. A child imitates its elders; the average man or woman hates to be out of fashion in dress, demeanour or thought. The psychology of a crowd is a psychology of imitation.

We can now pass to a consideration of a few illustrations of functional nervous disorders, first repeating the proposed definition, *viz.*, a functional nervous disorder is a sustained disharmonious correlation of functional activity to the reality of environment dependent upon normal neuro-physiological processes, acting in a vicious circle.

(1) Disorders Originating in Reflex Mechanisms.

A wound causes a reflex protective spasm of neighbouring muscles immobilizing the injured part. After the injury has healed, the spasm may be maintained by newly acquired postural tonus in part, but more particularly by an emotional complex. Attempted movement leads to pain and pain maintains the hypertonus. The patients in these cases need a demonstration in relaxation and a plausible solution of their emotional complex.

A similar condition is frequently seen after an injury to the back or a severe lumbago. The guarded hypertonus outlasts the injury, the overworked muscles resent function and pain leads to maintenance of guarded attention.

Strong voluntary movements are accompanied by contraction of antagonistic muscles. This fact enters into cases such as these just mentioned.

The reverse condition of muscle hypotonus and functional paralysis is seen after wounds where nerve injury has occurred. Conviction of paralysis has been produced and, as in the patient shown this evening, the disability may remain for years until the possibility of voluntary movement is demonstrated.

The above cases illustrate converse phenomena of attention. Fixation of attention on any part leads to hypertonus; conviction of absence of function causes inattention to faint indications of returning function. The latter explanation covers the conditions of blindness, deafness and hysterical anæsthesia after shell concussion.

After an attack of trench feet or an injury to the foot, the plantar flexors are frequently left in a wasted condition. The dorsal flexors come predominantly into action, pulling the toes up and forcing down the heads of the metacarpal bones. This causes pain and leads to exaggeration of dorsi-flexion. Re-education of plantar flexors is necessary.

Constipation may cause painful defæcation, which may lead to inhibition of defæcation and consequent exaggeration of constipation (dyschezia).

Inflammation of a knee joint leads to reflex wasting of muscles, especially the quadriceps; this causes weakness of the joint. If the limb is not given sufficient function, the weakness remains and the muscle further wastes.

Illness leads to hypotonus of the muscles of the back, this to deformity, which increases the deficiency of the spinal muscles.

Attention directed to any part of the body leads to increased tonus of muscle, which facilitates a reflex response to a minimal stimulus; this fixes attention on the part and attempts at voluntary inhibition still further fix attention and facilitate the reflex response. Such a tic is further liable to be the vicarious expression of an emotional complex. Relaxation and explanation are required.

Castigation of a boy of 13 years of age caused reflex defæcation. Emotional response on seeing the school next morning repeated the reaction. After this

fear of repetition perpetuated the disability for eight years until treated.

(2) Disorders Originating in Emotional Mechanisms.

In normal life a man is educated to believe that fear is cowardice. Most men consider they are incapable of cowardice and therefore of fear. Under the exceptional conditions of war, a man's emotional systematization may be unable to inhibit expression of fear. We, therefore, see the "shell shock" patient, who could serve as an artist's model of the personification of fear, stoutly denying that he is afraid and clamouring for return to the front. This very desire to disprove fear leads to war dreams, loss of sleep and increased sensitiveness to emotional stimuli, so perpetuating the conflict. This explains why the strongest minded and conscientious men are apt to suffer most from unresolved complexes of shell shock. Where such complexes remain for a long time, family complexes and the complex of the "indignity of labour" may take root and become predominant. Practical experience of these men confirms the opinion that it is not for want of will that many persist. It is very often the intensity of the emotional response in the face of decreased efficiency that keeps up the emotional instability which is an essential factor in the origin of the disability.

The indications of treatment are to get the man to understand himself, to relax, to take a less serious view of his disability and to provide a practical outlet for his surplus emotions.

In civilian life a child is trained to inhibit any emotional attraction towards its excretory organs by emotions of shame and disgust. At the same time the child's attention is distracted as much as possible from anything relating to reproduction. This is a difficult matter, as a child is acutely observant.

It is obviously useless to instruct him in functions which he is not mature enough to understand without going into sordid detail. Yet any direct obstruction to the child's pursuit of knowledge only increases his curiosity. The child is, therefore, tactfully side-tracked by fairy tales, which he more or less believes.

Normally the more strongly developed emotions of adolescence are co-ordinated to new social interests and activities which gradually make the youth cognizant of the significance of sex and the child grows by degrees into the mature adult. Abnormally, but, unfortunately, not uncommonly, youthful attention is directed to the blatant facts of the case without the preparatory stage of romantic emotions.

In this case flood gates of emotional desire on one hand and emotions of shame and disgust on the other, are apt to be simultaneously opened. Surging alternations of emotion are experienced and both emotional systems become oversensitive. The sexual emotions become aroused by all manner of far-fetched associations. At the same time the exaggerated reactions of shame and disgust cause the youth to withdraw from the company of others and to become more and more wrapped up in his conflict.

Here, again, the indications are to teach the youth to understand himself, to relax his blind attempts to battle with himself, to take a less serious view of his trouble and to supply him with a practical outlet for his surplus emotions—hard work and games.

A soldier who was an obvious weakling, used to sit up in his bed in a semi-conscious state, screwing up his sheet in his hand and breathing out threatenings and slaughters. The man was a physical wreck and greatly upset by these half-dreaming "turns." It appears that he did not acquit himself well in his first and only engagement and had to be led out in a semi-collapsed state. He was immensely mortified with himself and his dream state of screwing off German heads with his hands was a very natural wish-fulfillment.

A woman fell in love with a scoundrel who stated that he would blow his and her head off if she renounced him. She discovered his true nature and ceased to love him, but was too terrified to state her altered emotional systematization in words. She suddenly lost all sensation in the top of her head to her own terror and distress, yet a more direct statement of her conflicting desires could not be given.

A woman who had a horror of marital relations, developed a peculiar internal sensation like falling, which she referred to her spine; also a horror of knives, an intense aversion to her husband's shooting trophies and an intense emotional reaction after hypodermic medication. She frequently dreamed of prickly pears.

These two cases are good examples of symbolisms. The second case illustrates a not uncommon phenomenon in married life, where the emotion of love is not developed with sufficient intensity to overcome the educated emotion of disgust.

A woman suffering from palpitation of the heart, stated at first that her first attack occurred in the street. It transpired that she was unhappily married and that she met her sister in town and had tea with her. In the midst of a recital of her woes and in the height of strong futile emotions, her heart suddenly began to run riot. This patient also frequently dreamed of prickly pears.

A soldier suffering from hysterical vomiting, stated he had had a relapse, without any exciting cause. By persistent questioning it finally turned out his wife was reading the paper while he was pondering over the fire and finally he remembered she was read-of a poisoning tragedy. He then recognized the cause.

During an intense emotional state—"dumb with fear" or "voice choked with emotion"—voice production may be temporarily impossible. Voluntary effort to speak being unavailing, the subject may become convinced that his voice is lost; the aphonia becomes permanent until re-education is applied or until some sudden emotion, *e.g.*, slipping on orange peel or sudden laughter, overcomes the inhibition of the conviction.

Fear and grief are the two emotional complexes usually associated with aphonia. Of these the former is more easily treated and cure is usually permanent. A grief complex is more difficult to resolve and recurrence is more liable to occur.

The common *globus hystericus* is an incomplete spasm of laryngeal muscles usually dependent upon a grief complex,

Stuttering usually represents the operation of the same emotional forces as aphonia, but to a lesser degree of intensity. Imitation is also a frequent cause. Speech is a symbolic expression of ideas in sentences; difficulty in utterance leads to consciousness of expression of words and strenuous efforts to say them. Sounds are produced from the larynx and are modified into words by mouth movements. The stammerer puts tremendous energy into his mouth movements and only succeeds in blocking the air column and with it the sound production in the larynx.

Patients who complain of failing memory, periods of amnesia, etc., are in reality affected with absent-mindedness, *i.e.*, they are responding to strong emotional systems of thought and attention is distracted from the immediate stimulus of the environment.

The typical example of absent-mindedness is the learned professor. Where such streams of thought are at the same time partially inhibited by the emotional systematization of character, they may become entirely unconscious. If frequently repeated, a second conscious character or personality may appear harmonized with the reactions antagonistic to the emotional systematization of the primary character. This latter phenomenon is illustrated to a slight extent in all of us; no one shows a stabilized system of reactions, as no character is perfectly consistent.

Imitation unconsciously operating is a frequent factor in hysterical symptoms, *e.g.*, the infectiousness of stuttering, of outbreaks of witchcraft in olden days and of symptoms of war shock in base hospitals in the recent war.

Conflicting emotions or ideas are accompanied by frowning. Such overaction of scalp muscles, if long continued, leads to frontal or occipital headache and feelings of pressure on the vertex. Relaxation movements of scalp muscles are useful in such cases.

Vomiting is one of the most direct expressions of the emotion of disgust and is liable to be a fixed symptom by association with a complex, *e.g.*, in soldiers when vomiting first produced by gas becomes an expression of self-disgust at personal failure.

Vomiting of pregnancy is undoubtedly at times dependent upon emotional factors. The best proof of this is the ethnological custom of *couvade*, according to which it is the husband who is carefully attended and nursed during his wife's pregnancy and puerperium. I have heard of three cases of morning vomiting of husbands during their wife's pregnancy in our own State of South Australia.

The mechanism of symptom formation in neurasthenia, psychasthenia and hypochondria is essentially a fixation of attention on bodily function by an emotion of fear. This is well illustrated by a personal example. A cutaneous lesion leads to fear of tetanus, which fixes attention on the tonus of the masseters. Try as one will to forget it, consciousness of the tonus of these muscles recurs. Fixation of attention leads to hypertonus and awkwardness of movement and this feeds the fear. With such a fear, however, there is a time limit and with the expiration of the time limit fear subsides and with it the vicious circle. When, however, there is no time limit of fear, fixation of attention becomes a habit. Examples of originating fear in my experience have been as follows: The swallowing of a bone, breaking a religious vow, venereal disease and, most frequent of all, failure of adaptation to sexual maturity. In the last any irregularity is believed generally by the public to lead to consumption, epilepsy, impotence, insanity, paralysis, etc.. The unfortunate adolescent studies himself hourly for signs of commencing dissolution and becomes amazingly conscious of his heart beats, his intestinal movements, breathing and various skin sensations, etc., all of which are normally subconscious functions. I have been struck by the similarity of description of symptoms given by neurasthenic patients to those given by aborigines concerning victims who had been killed by magic.

Allied to neurasthenia is the condition seen in patients who have become educated to oversensitive judgement of right and wrong in conduct. Such patients become oversensitive to failure and see in glances of strangers, casual conversations, mannerisms of other people and in accidents of the environment, a judgement of personal wrong-doing. Their hypersensitiveness leads them to shrink within themselves and thereby they become more sensitive.

Insanity represents a deep-rooted disorientation of emotional systematization to reality and such cases are replete with illustrations of the mechanisms described.

Therapy.

After this sketch of the pathology of functional nervous disorders, I wish to close with an outline of the principles of rational therapy.

Appropriate treatment depends, as in all medical science, on correct diagnosis. This frequently involves a delicate discrimination, *e.g.*, in an anæmic neurotic woman with an atypical Babinski sign, the practitioner must ascertain how much of a paraplegia is organic and how much functional.

The condition of a functionally disabled patient is dependent upon ignorance of the laws of his own conduct and emotions. He is like a man battling hard in a game, but ignorant of the rules—constantly penalized by the umpire, pain, and merely jeered at or told to "pull himself together" by his fellow players. Rational psycho-therapy aims at tracking down these penalties and abnormalities of conduct or adaptation to their appropriate emotional causes. The patient thus learns the laws of the game of life and understands how to play the game.

The aim of psycho-therapy is to produce mental ease and content, the *æquanimitas* of Sir William Osler. This is a procedure which always consumes time and which sometimes gives refreshingly good results, but failure in others, as in all methods of therapy.

It was stated at the commencement of the paper that consciousness is not an interacting force in life. It may, therefore, be asked if a patient's will is not an active force. It certainly is, but will is consciousness of the operation of emotional reactions succeeding desire or interest. A patient without will is, therefore, a patient without normally directed controlling desires or interests and it is by the cultivation of these that will power becomes effective. An admonition to a patient to "buck up" is simply an attempt to arouse in the patient a reaction pleasing

to the person giving the advice. If this person is essentially hated and despised, the advice only results in an antagonistic reaction—the phenomenon of negativism. Frequently over intense desire and will are the chief factors maintaining a vicious circle of disability.

There is another method of treatment, *viz.*, that of hypnotism or suggestion. This may be called the surgery of psycho-therapy. Just as in a surgical operation a bone graft may be introduced into the patient's body or a pathological growth removed, so by hypnotism a ready-made conviction is introduced into the patient's mental systematization or a pathological conviction is expunged.

Exactly as in surgery, where success depends upon whether the inserted graft takes or whether the excision of the growth is complete, so in hypnotic treatment success depends upon whether the newly implanted conviction can be synthesized into the patient's mental systematization on one hand or whether all the roots of the pathological complex have been expunged on the other. Clear indications are necessary before a surgical operation is performed and they are also necessary before hypnotism is employed. There indications are of the nature of a last resource.

Conflicting emotions usually lead to perversion or diminution of normal activity, and physical re-education is necessary, as well as mental re-education. Massage, hydrotherapy and electricity are useful in early stages in severe cases to relieve spasm or to increase nutrition and to obtain function without undue fatigue. It is most important to impress on the patient, however, that these are only introductory methods, otherwise long continuance or use of these methods for vague psychological results is apt to lead to increased pathological fixation on the disability. Normal function is the desired aim and this is produced only by practice in normal function by voluntary exertion on the patient's part. Demonstration of relaxation, re-educational exercise, general exercises, games and real work are the important therapeutic means. The pleasurable emotional tone following active successful effort is the best tonic for these patients.

Where organic disease is coincident, appropriate treatment is naturally required.

Just as knowledge of pathology of organic disease does not involve possibility of cure of all disease, so knowledge of the pathology of functional disease does not supply an infallible remedy. As, however, knowledge of the nature of tuberculosis, diabetes and appendicitis has given best results by making early diagnosis possible and therefore treatment comparatively effective, so increasing knowledge of functional nervous disorders will lead to early diagnosis and more efficient treatment.

INTESTINAL PARASITES IN NORTH QUEENSLAND.[1]

By **S. M. Lambert, M.D.,**
State Director (Acting), International Health Board, and Medical Officer in Charge of Field Unit No. 1, Australian Hookworm Campaign.

An idea of the prevalence of the more common intestinal parasites in the coastal belt of North Queensland may be obtained from the records of the hookworm investigations made during the two years from April, 1918, to April, 1920. The first part of the work was done under the direction of Dr. J. H. Waite and during the last two months of the period Dr. H. Hastings Willis was in charge of a field staff at work in this region. The statistics of Dr. Waite and Dr. Willis have been combined with my own in this report.

The studies and observations on which this report is based, were conducted with the support and under the auspices of the Queensland Government, the International Health Board of the Rockefeller Foundation and since October 1, 1919, the Commonwealth of Australia.

Examinations for intestinal parasites were made in the coastal belt from Proserpine to Cooktown. With the exceptions of Ayr, where the work has not been completed, and Townsville and Charters Towers, where only school children were examined, the figures are based on the examination of approximately 95% of the population of the regions investigated. The rural population as well as the urban was examined and is reported on in this paper under the names of the towns in which the headquarters of the field units were located.

In Table I. are shown the number of times that each kind of intestinal parasite was found and the incidence expressed in the percentage of the total number of examinations. The table is limited to a report of the intestinal worms found, as the method of examination was not such as to disclose protozoa under ordinary circumstances and a report of the few instances in which protozoa were noted, would be misleading. The examinations were made primarily for hookworm infection and search was discontinued, as a rule, when hookworm ova were found. As the discovery of the ova and larvæ of other parasites was incidental, the figures for their prevalence would be a little low. The same comment would hold for the statistics from other countries shown in Table II..

TABLE I.—INFECTIONS BY COMMON INTESTINAL PARASITES IN NORTH QUEENSLAND.

	Number.	Per cent.
Persons Examined	29,745	——
Total Infections	5,601	18.83
Infections with—		
Hookworms (*Anchylostoma duodenale* and *Necator americanus*)	4,910	16.51
Ascaris lumbricoides	31	0.10
Trichuris trichiura	336	1.13
Strongyloides stercoralis	106	0.36
Oxyuris vermicularis	126	0.43
Hymenolepis nana	87	0.29
Other Tapeworms	5	0.02

Before it was decided that a specimen of fæces did not contain hookworm, two plain smears were examined and also two smears of the sediment after centrifuging.

For comparison there are shown together in Table II. the data regarding the prevalence of intestinal worms in Queensland and in certain of the other countries for which reports of the International Health Board on hookworm investigations are at hand.

[1] Read before the Section of Pathology of the Australasian Medical Congress, Brisbane, 1920.

TABLE II.—PREVALENCE OF INTESTINAL WORMS IN QUEENSLAND AND OTHER COUNTRIES.

	North Queensland.	Georgia (U.S.A.).	Tennessee (U.S.A.).	Costa Rica.	Dutch Guiana.	Ceylon.	Panama.	Salvador.
Persons Examined	29,745	35,133	7,902	119,364	17,570	46,705	77,101	67,787
Hookworms—								
Number	4,910	10,186	885	71,949	15,945	45,416	58,078	37,213
Per cent.	16.5	28.9	11.19	60.3	90.8	97.2	75.3	54.9
Ascaris—								
Number	31	1,240	1,015	80,198	2,487	40,149	30,690	50,043
Per cent.	0.10	3.5	12.8	67.2	14.1	85.9	39.8	73.8
Trichuris—								
Number	336	10	162	89,355	1,530	22,157	16,379	26,755
Per cent.	1.13	0.03	2.05	74.8	8.7	47.4	21.2	39.4
Strongyloides—								
Number	106	29	—	3,484	1	19	2,340	1,108
Per cent.	0.36	0.08	—	2.9	—	0.04	3.03	1.6
Oxyuris—								
Number	126	11	51	315	2	6	102	301
Per cent.	0.43	0.03	0.65	0.26	—	—	0.13	0.44
Hymenolepis nana—								
Number	87	502	184	1,898	1	3	147	845
Per cent.	0.29	1.43	2.33	1.59	—	—	0.19	1.25
Other Tapeworms—								
Number	5	7	1	—	—	—	—	—
Per cent.	0.02	0.02	—	—	—	—	—	—

It will be seen from Tables I. and II. that North Queensland is rich in the variety of intestinal worms, but, in comparison with other countries in tropical and sub-tropical latitudes, the numbers are rather low. With the exception of hookworm the intestinal parasites are few in number and almost negligible. It is interesting to note that no bilharzia ova were found, although they were expected and carefully sought.

In Table III. is shown the geographical distribution of intestinal worms in North Queensland.

TABLE III.—DISTRIBUTION OF COMMON INTESTINAL PARASITES BY DISTRICTS IN NORTH QUEENSLAND.

District.	Examined.	Total Infections.	Per cent.	Infected with— Hookworm.	Per cent.	*Ascaris.*	Per cent.	*Trichuris.*	Per cent.	*Strongyloides.*	Per cent.	*Oxyuris.*	Per cent.	*Hymenolepis nana.*	Per cent.	Other Tapeworms
Cooktown	852	211	24.76	169	19.83	3	0.35	24	2.81	2	0.24	10	1.17	3	0.35	—
Mossman	986	298	30.22	270	27.38	1	0.10	10	1.01	2	0.20	13	1.31	2	0.20	—
Cairns	8,100	2,097	25.88	1,881	23.23	18	0.22	82	1.01	28	0.34	54	0.66	13	0.16	1
Innisfail	3,093	875	28.29	749	24.21	1	—	99	3.20	6	0.19	13	0.42	5	0.16	2
Ingham	3,404	1,149	33.75	1,079	31.69	—	—	46	1.35	4	0.11	12	0.35	8	0.23	—
Cardwell	221	103	46.61	102	46.15	—	—	1	0.45	—	—	—	—	—	—	—
Bowen and Proserpine	5,222	387	7.41	352	6.70	2	0.04	3	0.06	5	0.10	13	0.24	12	0.22	—
Ayr	3,630	102	2.81	72	1.98	3	0.08	2	0.06	5	0.13	2	0.06	16	0.44	2
Townsville Schools	2,420	324	13.38	183	7.56	3	0.12	59	2.43	52	2.14	—	—	27	1.11	—
Charters Towers Schools	1,817	75	4.12	53	2.91	—	—	10	0.55	2	0.11	9	0.49	1	—	—
Total	29,745	5,621	18.89	4,910	16.50	31	0.10	336	1.12	106	0.35	126	0.42	87	0.29	5

The methods of excrement disposal, when the first survey was made, were practically at the same low standard in all districts. Out of 6,600 privies examined, only 375 were up to a standard that gave adequate protection against soil pollution.

From Table III. it will be seen that in all the cane-growing districts, except the Ayr district, which is in a belt of low rainfall, there is a heavy infection rate for hookworm.

At the coast this belt extends from Townsville through Bowen and includes Ayr, Bowen and the back country. All of this relatively dry area has a light hookworm infection, but to the north and south, where a heavier rainfall is experienced, the rate of infection is higher. The relatively dry area has a soil of sandy loam and the conditions other than rainfall appear to be as favourable to the propagation of hookworm as those of the areas to the north and south. Figure I. shows the relation of the places examined to areas of high and low rainfall. The rainfall in inches and the incidence of hookworm in percentage of population are shown by the figures under the names of the districts investigated.

In Figure I. the percentage of hookworm infection is based on investigations in connexion with intensive control operations, except in the cases of Townsville and Charters Towers. In these cities the rate is estimated and taken as one half the rate found among school children. This is about the usual relation. In the other districts the figures cover the rural population of the region as well as the central towns and cities, whose names appear in the tables and figures.

If we consider separately the districts having a rainfall over 50 inches, we find an average percentage of hookworm infection of 24.9.

In the districts with a rainfall below 50 inches, in the region under consideration, we find an average percentage of 2.5% infection. In Table IV. the figures are summarized to show the relation of the prevalence of infection with hookworm to rainfall.

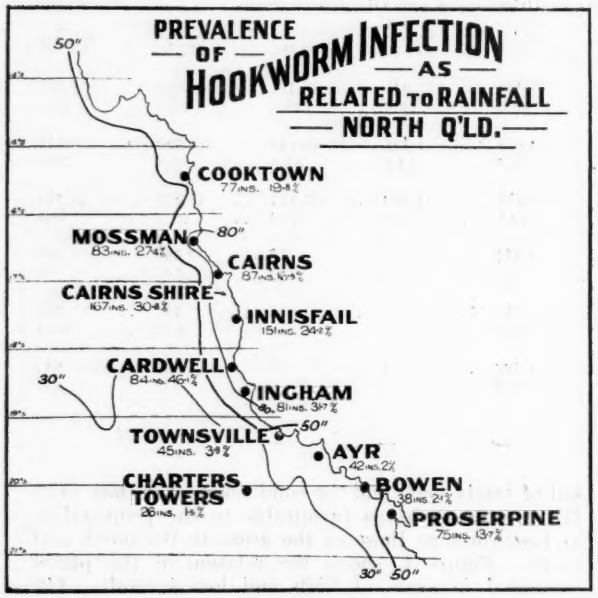

FIGURE I.
Relation of Rainfall to Prevalence of Hookworm Infection.

TABLE IV.—SUMMARY OF DATA TO SHOW EFFECTS OF RAINFALL ON PROPAGATION OF HOOKWORM.

Annual Rainfall.	Persons Examined.	Infected with Hookworms.	Per cent. Infected.
Over 50 inches	18,609	4,637	24.9
Under 50 inches	11,136	273	2.5
Totals	29,745	4,910	16.5

The following table shows the classification by sex of 25,508 persons examined:

TABLE V.—DISTRIBUTION OF HOOKWORM DISEASE BY SEX.

Sex.	Examined.	Infected with Hookworms.	Per cent.
Males	13,852	2,604	18.8
Females	11,656	2,070	17.8
Totals	25,508	4,674	18.3

The higher percentage of infection in males than in females was expected, as most of the infection enters from the soil through the skin of legs and feet and the work of the men is to a large extent out of doors.

In making up Table VI., showing the distribution of hookworm infection by ages, the figures for the school surveys at Townsville and Charters Towers have been omitted, as they would swell unduly the proportion of infections for the age group from six to eighteen years.

The grouping by ages shows that the percentage of infection with each parasite is higher in the age group from 6 to 18 years. This age is the barefoot age and the school age. Going barefoot gives the parasites their opportunity to penetrate the skin and gathering children together at school increases the spread of infection through soil pollution unless proper privies are provided and instruction is given to bring about their exclusive use.

The question suggests itself whether there is not some added significance in the fact that the infections in this age group are twice those in the group from 19 to 40 years and three times those in the group from 41 to 60 years. In a search of the publications accessible to me I have been unable to find any other instance in which the proportion of cases in the age group from 6 to 18 years is so high. The second decade is uniformly the age period of heaviest infection, but the percentage usually falls off more slowly through the later decades of life.

The unusually high proportion of the infections in childhood may be due largely to the wearing of shoes by a larger proportion of the adults than in most of the countries with which comparison is made.

It suggests, however, that the infection may be rapidly spreading and that the present generation of adults were not so highly infected in childhood as the children of to-day. Untreated hookworm infection has been reported as enduring from 6 to 15 years.

The following table (Table VII.) shows the distribution of intestinal worms in northern Queensland

TABLE VI.—DISTRIBUTION OF INTESTINAL WORMS BY AGES OF INFECTED INDIVIDUALS.

Ages.	Examined.	Total Infections.	Per cent.	Infected with: Hookworm.	Per cent.	*Ascaris.*	Per cent.	*Trichuris.*	Per cent.	*Strongyloides.*	Per cent.	*Oxyuris.*	Per cent.	*Hymenolepis nana.*	Per cent.	Other T'pew'ms
0-5 years	4,287	724	16.88	627	14.62	2	0.04	55	1.28	5	0.11	28	0.65	6	0.13	1
6-18 years.	7,539	2,532	33.59	2,255	29.91	9	0.11	139	1.84	30	0.39	65	0.86	34	0.45	—
19-40 years.	9,102	1,505	16.53	1,391	15.28	12	0.13	50	0.54	14	0.15	17	0.18	17	0.18	4
41-60 years.	3,893	393	10.09	359	9.22	4	0.10	20	0.51	2	—	6	0.15	2	—	—
Over 60 yrs.	687	48	6.98	42	6.11	1	—	3	0.43	1	—	1	—	—	—	—
Total	25,508	5,202	20.39	4,674	18.32	28	0.11	267	1.04	52	0.20	117	0.45	59	0.23	5

TABLE VII.—DISTRIBUTION OF COMMON INTESTINAL WORMS BY RACES.

	White.		Aborigines.		Yellow.		Kanaka.		Indian.		Total.
Examined	23,835		1,048		467		121		37		25,508
	Infected.	Per cent.	Infected.	Per cent.	Infected.	Per cent.	Infected.	Per cent.	Infected.	Per cent.	
Hookworms	3,790	15.90	808	77.09	35	7.49	27	22.31	14	37.83	4,674
Ascaris	14	0.05	—	—	13	2.78	1	—	—	—	28
Trichuris	208	0.87	47	4.48	12	2.56	—	—	—	—	267
Strongyloides	47	0.19	4	0.38	1	—	—	—	—	—	52
Oxyuris	115	0.48	2	0.19	—	—	—	—	—	—	117
Hymenolepis nana	49	0.21	10	0.95	—	—	—	—	—	—	59
Other Tapeworms	4	0.01	1	—	—	—	—	—	—	—	5
Total Infected	4,227	17.61	872	83.20	61	13.06	28	23.14	14	37.83	5,202

by races for the same series of examinations covered by Tables V. and VI..

This table shows that the aboriginals are far more heavily infected that the other races with hookworms, trichuris, strongyloides and hymenolepis. The yellow race has the lowest infection rate with hookworms, but the highest with ascaris. The Kanakas and East Indians are more heavily infected that the whites with hookworm. The few East Indians examined were found with no other intestinal parasites than the hookworm.

The reason for the heavier infection among the aboriginals with most of the parasites studied may be found in the total lack of a sanitary conscience. Consequently, every bowel disease that they acquire, tends to spread rapidly.

Save for hookworm and oxyuris, intestinal worms in northern Queensland seldom cause sufficient symptoms to bring a patient to a doctor. We have never been asked to examine a patient for any parasite except these two. Hookworm disease itself seldom produces obvious symptoms in the relatively dry region, with an annual rainfall of under 50 inches, from just north of Townsville to just south of Bowen, save where children have come from heavily infected areas. The only exceptions to this statement which have been noted, are the conditions at the Townsville Orphanage, which is highly infected, and those in the Ross Island district of Townsville, where the infection is higher than in the remainder of the community.

On the other hand, in the belts where the rainfall exceeds fifty inches, we find many persons, especially those of school age, who are suffering from anæmia and its consequences, including dwarfism and retarded mentality. The affects on the mentality were shown by Waite and Neilson[1] in their study of school children in northern Queensland. These studies were made in the area of high rainfall north of Townsville. Table VIII. is taken from that study. It shows in months the mental retardation caused by hookworm disease.

TABLE VIII.—EFFECT OF HOOKWORM DISEASE ON SCHOOL CHILDREN.

	Non-Infected.	Lightly Infected.	Heavily Infected.
Number of Cases Tested ..	116 ..	65 ..	159
Average Retardation by Binet	3.9 mos...	9.3 mos...	23.4 mos.
Average Retardation by Porteus	2.7 mos...	4.7 mos...	16.0 mos.
Average Hæmoglobin by Talqvist	85.1% ..	76.4% ..	70.9%

It is usually difficult, if not impossible, to trace the paths by which intestinal parasitic infections have spread, but interesting facts are occasionaly brought out by the reports of field inspectors of the Hookworm Campaign. For instance, among 53 school children found to be infected at Charters Towers, a history was taken in 45 cases and it was found that 16 of the 45 children or 35.6% came from the State Orphanage at Townsville and six more came from outside districts known to be heavily infected. In the township of Bowen there were only 34 persons infected with hookworm and 25 of these or 73.5% had spent two or more years in outside heavily infected districts.

Indebtedness is acknowledged to Dr. A. Breinl, Director of the Australian Institute of Tropical Medicine, for the statistics of 2,420 Townsville school children examined by the members of the staff of the Institute and to Mr. W. J. Tully for assistance in compiling the statistics.

Summary.

In the examination of the fæces of 29,745 persons in north Queensland, the infection rate for hookworm was found to be 16.5%. The only other intestinal worm infecting over 1% of the persons examined was *Trichuris trichiura*, which occurred in 1.13%

With the exception of hookworm, the intestinal worms of north Queensland are of low prevalence and seldom produce symptoms sufficient to bring the patient to a doctor.

In the areas having an annual rainfall of over 50 inches, hookworm infection was present in 24.9% of the population, while in those areas having a lower rainfall the average was 2.5%.

[1] Waite, J. H., and Neilson, I. L.: "A Study of the Effects of Hookworm Infection upon the Mental Development of North Queensland School Children," *The Medical Journal of Australia*, Vol. I., 6th Year, pp. 1-8, January 4, 1919.

Reviews.

THE TEACHING OF CLINICAL MEDICINE.

The Dean of the Faculty of Medicine and the Professors of Contagious Diseases and of Clinical Medicine in Paris have launched a new system of medicine, which is to appear in twenty-one volumes of 400 to 500 pages each, at intervals.[1] This most important work is intended to replace the treatise of Charcot, Bouchard and Brissaud, which was published in 1891 as the first complete system of medicine in France.

We are fortunate in having at this time such a complete rendering of the present teaching in modern medicine.

Coincident with and following the war, there has occurred such a flood of new views and such an outpouring of results of research and experiment in all parts of the world that it is essential for the practitioner and the student to have some such summary of the work done and some guide to the direction of progress. If the first volume which is here reviewed is any criterion, this monumental work should be as much a classic as was its distinguished predecessor.

In this volume the authors deal with infectious diseases in general and with infection by various organisms in detail. Streptococci, staphylococci, pneumococci, meningococci and other organisms are described.

Five volumes are to be devoted to infectious diseases; other volumes will be reserved for deficiency diseases, diseases of endocrine glands, the hæmolymph system, the liver, the kidneys, the digestive and other systems.

Each subject is dealt with by a recognized authority, who clearly and concisely presents the views generally accepted throughout the world and to these adds a summary of recent research and experimental work in France, America, Scandinavia, Great Britain and Germany.

The perusal of these pages reminds us to how great an extent modern medicine is an international affair and how much of our knowledge is due to the work of French scientists.

Immunity and the reaction of the organism to invasion by bacteria are discussed by the Dean of the Faculty at Paris. He deals at some length with the chemical products of infecting agents in culture media, *e.g.*, lipoids, acids, soaps, products of carbo-hydrates, proteins, albumoses, peptones, mucins, amino acids and bases among which are the ptomaines. He enumerates the bases of putrefactive origin, such as methylamine, cadaverine, putrescine, choline, etc., and discusses the possible effect of these various chemical substances on the organism invaded.

[1] Noveau Traité de Médecine, Publié en 21 Fasicules sous la Direction de MM. G. H. Roger, F. Widal et P. J. Teissier. Fascicule Premier: Maladies Infectieuses; 1920. Paris: Masson et Cie; Crown 4to., pp. 482, with 55 figures in the text and three coloured plates. Price, 35 fr. net.

In connexion with the action of these chemical products M. Roger states that the local effects of the *Bacillus tuberculosis* are due to its lipoids. The lipoid extracted by ether causes caseation and the lipoid extracted by chloroform causes sclerosis.

The author quotes Droun, Cohnstein, Muscatelli and Ceni, who claim that their researches show a decrease in the alkalinity of the blood corresponding to a decrease in immunity of the organism in such conditions as starvation, overwork, poisoning by alcohol or chloral. Unfortunately, it is not stated in what sense the term alkalinity of the blood is used.

Recent ideas on the non-specific action of vaccines and on the action of detoxicated vaccines are not discussed.

Four types of meningococcus are described. The author points out the necessity for early treatment with a polyvalent serum, followed by a monovalent serum as soon as the causal type is isolated, in cerebro-spinal meningitis. A new feature of cerebro-spinal meningitis is an account of the organization of the exudate in the subarachnoid space, with the formation of adhesions and consequent obstruction to the flow of the cerebro-spinal fluid.

These cases are recognized clinicaly by a recrudescence of symptoms following improvement under serum treatment and by a diminution in the amount and change in the character of the fluid withdrawn by lumbar puncture (the fluid becomes clearer and shows fewer polymorpho-nuclear cells, while puncture in the cervical region or of the ventricles of the brain discloses a turbid fluid under increased pressure. The treatment of this condition is puncture of the ventricles or cervical puncture, followed by the introduction of anti-meningococcic serum.

In septicæmia treatment by autogenous or polyvalent sera and by intravenous injections of solutions of collargol, electrargol, methylene blue and peptone are recommended.

Lobar pneumonia is said to be due most commonly to infection by contact rather than to auto-infection from the patient's naso-pharynx. It is stated that Types III. and IV. of the pneumococcus, which are the common inhabitants of the naso-pharynx, are rarely found as the causal agents in frank pneumonia.

The results of treatment by antipneumococcal sera in France seem to have been indefinite, even against Type I..

As regards enterococci, the author states that it is difficult to determine when this group of organisms is pathogenic, as it is a normal inhabitant of the intestines. Excessive proliferation on culture and virulence to animals are said to be the only means of distinguishing the virulent from the avirulent forms.

Enterococci have frequently been found in the blood in acute articular rheumatism.

According to A. Veillon, anaerobic organisms are always present in cases of gangrene which are associated with fœtor and sloughing; a putrid odour or the presence of gas in any lesion of this kind indicates the presence of anaerobes.

Gonococcal infections are dealt with at some length by M. Hudelo. The determination of complement deviation is held to be a valuable aid in diagnosis of any gonococcal lesion. The author is of the opinion that vaccines have been useful in the treatment of complications, such as epididymitis and gonococcal arthritis, but considers that they are of doubtful value in acute and chronic urethritis.

No distinction is drawn between the results of treatment by ordinary and sensitized vaccines; the author merely reports the claims advanced by different clinicians.

Detoxicated vaccines, which have recently been recommended in England, are not mentioned.

Protein-therapy is only mentioned in connexion with the injection of boiled milk. No mention is made of the value of intravenous injections of vaccines, *e.g.*, typhoid vaccine, in the treatment of infection of the joints by the diplococcus of Neisser.

It is regrettable that this great work is so poorly indexed, the index being merely a summary of the general features of the subject matter.

ELEMENTARY RHINO-LARYNGO-OTOLOGY.

It is impossible to compress into the compass of a volume of just over 300 pages minute details concerning the affections of the nose, throat and ear. Hence in W. S. Syme's "Handbook of Diseases of the Nose, Throat and Ear,"[1] little more is presented than an outline of the diseases more commonly met with, together with their treatment, and but a mention of the rare conditions. Nevertheless, the little book succeeds admirably in conveying a knowledge of the chief affections in a small compass and the treatment recommended, being solely what the author has used and found satisfactory, can be adopted with confidence. The anatomy and physiology of the parts concerned have been omitted and there is little discussion of the pathology. Descriptions of methods of operative procedure are few and, in most instances, not detailed. Methods of examination are shortly and clearly set out, but the illustrations accompanying them are not very helpful, the reproductions of photographs lacking clearness of detail and the drawings being but crude diagrams. The author repeats the old error of the closure of the *rima glottidis* by the epiglottis during the act of swallowing. No new matter is discoverable in the volume, but the contents are well classified and arranged, the text being divided, not into chapters, but into short sections for each condition or affection, the name of which is set out in the cross heading. A useful formulary is appended.

The New South Wales Government Tourist Bureau has issued a special overseas number of *The Tourist*, in which some irresistible attractions of the State are introduced to the reader by means of terse descriptions and beautiful reproductions of photographs. Although the pamphlet is ostensibly destined for the other side of the world, we feel confident that every lover of nature in the Commonwealth will be happy in the possession of a copy. Moreover, this little booklet will be found very serviceable to anyone planning a holiday and undecided where it should be spent.

University Intelligence.

THE UNIVERSITY OF WESTERN AUSTRALIA.

A short time ago the Senate of the University of Western Australia considered a letter dealing with a university scholarship to be called the General Pau Scholarship, for which children of deceased soldiers of the Australian Imperial Force will be eligible. The scholarship has been endowed by a gift of £1,000 from General Pau. The annual value now stands at £52 10s.. It is to be awarded annually in turn at each Australian University, commencing with the most recent foundation. The scholarship will be awarded to the most brilliant student in the second year course in any faculty. In accordance with the conditions of the gift, the first award will be made to a Western Australian student.

In connexion with the acquisition of the new site for the University, the Senate has determined to issue an appeal to the public for the sum of £10,000.

The newly appointed Professor of Biology, Dr. George Nicholls, late of King's College, London, arrived in Perth on March 18, 1921, and immediately entered upon his duties. Miss M. G. C. Fordham, B.Sc., has recently been appointed temporary Assistant Lecturer in Biology.

MEDICAL DEFENCE IN NEW SOUTH WALES.

The New South Wales Medical Union after twenty-eight years of useful existence, has determined to modify the conditions of membership. An annual subscription of £1 1s. will in future entitle a member of assistance up to £1,000 in any one case. Assistance up to £2,000 can be obtained by the annual payment of £2 2s.. At the end of twenty years of membership no further subscriptions will be demanded. We publish in the present issue a short prospectus of the Union in our advertisement columns.

We regret to announce the death of Dr. Charles Smith, of South Yarra, Victoria.

[1] Handbook of Diseases of the Nose, Throat and Ear, for Students and Practitioners, by W. S. Syme, M.D., F.R.F.P., and S.G., F.R.S.E.; 1920. Edinburgh: E. & S. Livingstone; Crown 8vo., pp. 329, with 26 illustrations. Price, 9s. net.

The Medical Journal of Australia.

SATURDAY, APRIL 23, 1921.

Modern Hygiene.

Few words in the English language have been misused more often or more generally than hygiene. As the daughter of Asklepios was worshipped as the deity of health, the science of healthy living has been called hygiene. The usual limitation of the word to sanitation is not only unjustified from the origin of the term, but is harmful in misleading people who are endeavouring to further the science and practice of hygiene. Equally erroneous is it to include under the term the curing of disease. That art belonged to the father of Hygeia. With the misapplication of the term, a neglect of the wider field of the science has arisen. It must be remembered that the Mosaic law embraced the foundation of preventive medicine. The greater part of the ritual and of the personal religious ceremony of the ancient Jews is directed toward the preservation of health, while in the earliest records little can be found concerning the restoration of lost health. If it be held that the medical profession exists for the purpose of healing the sick and the injured, the most important function appertaining to the human body would be deprived of its proper custodian. Historically and from the point of view of logic hygiene in its widest sense belongs to the medical profession and represents its first and most important function.

In a report published in these columns a year ago it was claimed that while the fundamental sciences of medicine comprise chemistry, physics and biology, the ultimate sciences are medicine, surgery and preventive medicine. Of these preventive medicine is intrinsically and obviously the most important. An enormous amount of ingenuity, application, study and perseverance has been expended on the problems of curative medicine and surgery. Some triumphs have been achieved and a few pathological processes have been conquered. The vast majority, however, still defy the physician's knowledge and the surgeon's skill. It is essential that the individual suffering from a curable or an incurable malady should be able to command the services of a medical practitioner, for relief, temporary benefit and comfort, at all events, can be attained in this way. There is, however, no comparison from the aspect of humanity between the removal of a malignant growth and the prevention of the disease. The relatively slow progress of preventive medicine is due to the fact that the science of hygiene is not taught to our students. A little attention is paid in the medical course in our medical schools to elementary sanitation and to the A B C of immunity. The hygienist derives his real education outside the medical course. In our issue of February 19, 1921, we published an article read at the Australasian Medical Congress, Brisbane, 1920, by Dr. F. S. Hone on this subject. The inadequacy of the teaching of preventive medicine is exposed in all its ugly nakedness in this article. There are still no signs of a reform in any of our medical schools. We have advocated time and again the establishment of a chair of preventive medicine, partly because this would be an earnest of the introduction of adequate teaching of the most vital branch of medical science and partly because this step would be the means of breaking down the reactionary idea that the medical practitioner of the future has no concern with the maintenance of health. This matter is urgent, since the creation of a Federal Ministry of Health will lead in the immediate future to a wide extension of measures for the prevention of disease. The general practitioner has important duties to fulfil in a well-devised scheme for the combating of disease. In addition a considerable number of investigators will be needed to follow up the trails and lead the profession to its goal. This aspect of the functions of the medical profession is being recognized in Great Britain and in other European countries. Is it contemplated that our own Australian universities are to fail in their task of educating our students to equip them for their most important work? A failure on the part of our own medical schools would mean an appeal to the old world for men who have been trained in modern hygiene.

Slowly, surely, inevitably, the demand is coming from outside the medical profession for greater value of the services of medical practitioners. The question is being asked to-day, why are diseases which are

regarded as preventible, allowed to play havoc among the community? In a short time the demand will become more insistent. Must we wait until our medical schools have been shaken out of their lethargy? The teaching of curative medicine can proceed side by side with that of preventive medicine. There is nothing new in the idea that the science of hygiene should be applied widely for the benefit of the nation. The Jews adopted this doctrine thousands of years ago. The details of the teaching, it is true, must be wider, more definite and in accord with accumulated knowledge. The curriculum should contain provision for the practical and theoretical instruction in every branch of hygiene for all students, from the chemical problems of food, water and soil, through the physical aspects of sanitation to the chemical, physical and biological problems of the cause of disease and its eradication. The prospects for the improvement of the general health of the community will be in proportion to the thoroughness with which this instruction is imparted.

FAT SOLUBLE VITAMINE.

The fat-soluble accessory food factor denominated A is an uncanny, elusive substance, by no means very stable and yet essential for the growth of the young. It has been found that the animal body has no power to synthesize this factor. It or its immediate genetic predecessors must be supplied in the diet of the animal. Some authorities have asserted that fat-soluble A exists more plentifully in fats and oils of animal than of vegetable origin, notwithstanding the belief that all vitamines are derived from vegetable sources. Difference of opinion appears to obtain in regard to the effect of heat on this vitamine. It has been held that heating to 100° C., drying or conserving does not destroy it. More recently experimental evidence has been adduced to prove that it cannot resist heating to the boiling point of water and that it becomes inactive when exposed to various external influences. The importance of the stability of this accessory food factor is at once apparent when it is remembered that it is essential for growth and that it represents the agent which prevents the development of rachitis. Its distribution among the foodstuffs in common use has been followed with considerable care. In the numerous tables which have been set up, it appears that butter and cod liver oil are the two articles of diet richest in this factor and that cream, mutton fat, beef fat, fish oil, fish, liver, kidneys, heart, milk, eggs, wheat, linseed, cabbage, lettuce and spinach are all sources of it. Strangely lard is supposed not to contain any. It has been suggested that its absence in lard is essentially due to the high temperature to which pig fat is exposed in its commercial manufacture, especially in the United States.

Drs. J. C. Drummond, J. Golding, S. S. Zilva and K. H. Coward have recently published some important results which they have obtained in their continued researches into the question of the fat-soluble A accessory food factor. In the first place they investigated the anomaly of its absence from lard.[1] For the purpose of determining the cause of this absence, they studied the vitamine content of the fat of pigs fed on diets varying in their fat-soluble A content. A litter of Berkshire pigs was secured in a strong and healthy condition immediately after weaning at the age of eight and a half weeks. The litter was divided into five groups. The diet given to those in the first group consisted of wheat pollards (so-called toppings) and synthetic whey. This diet was devoid of fat-soluble A. The pigs gained in weight, although at a slow rate. The back and perirenal fat and the abdominal fat was also devoid of fat-soluble vitamine. The pigs in the next group received a diet of the same substances, with the substitution of natural for the synthetic whey. The fat of these pigs was also deficient in the vitamine. The diet given to the pigs of the third group comprised wheat pollard, whey and an unlimited supply of fresh green foods. Those of group four received no whey but ample quantities of toppings and green foods. The fifth group represented the control animals. Their diet was a well-balanced, varied farm diet, including grass. The fat of the pigs that had received a diet relatively rich in fat-soluble A, was found to contain appreciable quantities of the growth-promoting vitamine.

In the next place the investigators examined lard manufactured on a large scale in England from the abdominal fat of pigs reared in different farms. The fat was pressed to pulp, heated first to 82° C. by steam and then to 102° for from ten to fifteen minutes. One sample of the lard prepared in this way contained an appreciable amount of the fat-soluble vitamine. Other samples, however, proved to be inactive. They call attention to the infrequency of grass feeding of the pigs in England. Much of the lard manufactured in America is subjected to higher temperatures than 102° C. and oxidation is at times employed to remove discoloration and an unpleasant taste.

In another communication Dr. S. S. Zilva brings forward evidence to show that oxidation destroys the fat-soluble accessory food factor in cod liver oil.[2] It was noted that oil exposed to the radiations of the mercury quartz lamp became deprived of this property. Further experiments revealed that it was not the ultra-violet rays that produced this change, but the ozone generated. It would thus seem that the reasons of the absence of the fat-soluble accessory food factor in lard are to be sought partly in the usual diet of the pigs, which does not contain a plentiful supply of the factor, partly in the thermal destruction of the factor in the process of preparation and partly in the oxidation of the factor in the factory manipulations. Drs. Drummond, Golding, Zilva and Coward present a further argument which is probably true. The proportion

[1] *The Biochemical Journal*, December, 1920.
[2] *Idem.*

of the fat in the pig is much greater than it is in the bodies of other farm animals. The concentration of the vitamine would therefore be lower in the fat of the pig than in the fat of a cow or sheep.

Dr. Zilva and Dr. Masataro Miura have further pointed out that cod liver oil is much richer in fat-soluble accessory food factor than butter.[3] They recall the experience of clinicians in regard to the therapeutic value of cod liver oil in rickets. Moreover, they have found that crude, unrefined cod liver oil is much more active than the so-called purified oil. The claim put forward that crude cod liver oil is 250 times more potent than butter cannot be accepted without more evidence than has yet been adduced, since it is possible that the sample of butter tested was imported butter which had been subjected to heat for the purpose of sterilization. That unrefined cod liver oil is the richest source of fat-soluble accessory food factor seems to be a well-founded fact.

THE ACTION OF QUININE ON THE PREGNANT UTERUS.

It has long been a popular belief that quinine, when administered to pregnant women in large doses, acts as a powerful ecbolic. In July, 1918, a herbalist was arraigned before the Recorder at Bristol, England, on a charge of procuring abortion by means of quinine pills. He directed his customers to take ten to fifteen pills which were found on analysis by Professor W. C. Swayne and Mr. Edward Russell, of the University of Bristol, to contain about one gramme of quinine sulphate in all. Several of his clients undoubtedly miscarried after treatment and it was believed that the abortifacient action of quinine was responsible. Expert medical evidence given in Court was to the effect that the drug stimulates uterine contraction in labour and that it produces rhythmical contractions of the uterus in experiments on animals. These opinions were given cautiously and with reservation. The jury decided that quinine in large doses was a noxious drug and that it had been administered by the accused with intent to cause abortion. The herbalist was sentenced to twelve months' hard labour.

It is generally accepted as a result of clinical observation that quinine may precipitate the pains of labour in women who give a history of repeated inability to carry a child *in utero* to full term. But its unreliability as an ecbolic is proved by the fact that it has been repeatedly administered in large doses to pregnant women without ill effect. When it is remembered that experimental observations have definitely proved that the alkaloids of cinchona in large doses cause marked contractions of the uterus, it is difficult to understand why it is almost impossible to induce abortion by its use. The problem is an interesting one. It has its medico-legal interest as shown by the trial of the Bristol herbalist. It is of interest and importance to the profession in tropical and subtropical climates where pregnant women suffering from malaria require treatment with quinine. Major Hugh W. Acton[1] has carried out certain experiments on the excised pregnant wombs of guinea-pigs and rats. He placed the womb in a bath of Ringer's solution at 37° C., to which he added increasing doses of anhydrous quinine base. In a concentration of 1 in 300,000, the drug had no effect on the uterine muscle. When the concentration was increased to 1 in 150,000 definite, sustained contractions were recorded by the writing lever; when increased to 1 in 44,000 marked tonic spasm of the uterus supervened, sufficient, in the observer's opinion, to cause asphyxia of the fœtus owing to the constriction of the placental sinuses.

The nature of this experimental contraction is interesting. It is well known that during labour the lower uterine segment passively dilates while the strong contractions of the longitudinal muscles above Bandl's ring drive the fœtus downwards. The action of quinine was to excite contractions of the circular muscles of the lower uterine segment equally with the longitudinal muscles of the upper. The fœtus was, therefore, compressed, the uterus being tightly wrapped around it, as it were, but it was not expelled. The author believes that a concentration of 1 in 150,000, which may be regarded as the strength of quinine in the blood of the average woman after ingestion of as large a dose as 1.25 grammes of quinine sulphate, might be sufficient to induce labour if the membranes were thin and the *os* patulous or the cervix lacerated. In this way he explains the occasional ecbolic effect of the drug.

Major Acton's observations throw some light on the treatment of pregnant women suffering from malaria. If quinine is not exhibited, the hyperpyrexia which accompanies the exacerbations of the disease may kill the fœtus and premature miscarriage will then be spontaneously induced. It is safe and desirable to control the fever with the most effective means at our disposal—quinine or the other alkaloids of cinchona—but the doses should be small and repeated at frequent intervals. One to one and a quarter grammes of quinine in the twenty-four hours are sufficient to control the average attack and are insufficient to cause either death of the fœtus or immediate induction of premature labour. The practitioner who moves in areas where malaria is rife, will accept these conclusions with satisfaction. He will find it difficult, however, to drive from the minds of his patients a belief which has the stability of a religious tenet among the laity.

The attention of our readers is directed to a notice in our advertisement columns inviting applications from medical practitioners for the position of Medical Officers of the Royal Australian Navy. The service has been rendered much more attractive during the past few years as a result of the keen administrative control and sympathetic intermediation of the past and present Directors of Naval Medical Services. We commend these four positions to the favourable consideration of the younger members of the profession.

It has been announced that Dr. R. T. Paton, Director-General of Public Health in New South Wales, has been granted twelve months' leave of absence from May 1, 1921, prior to retirement. The Deputy Director-General, Dr. W. G. Armstrong, will assume the responsibilities of the position pending the new appointment.

[3] *The Lancet*, 1921.

[1] *Lancet*, January 29, 1921.

Abstracts from Current Medical Literature.

PATHOLOGY.

(148) Spirochætal Jaundice.

J. W. McNee deals with the morbid anatomy of spirochætal jaundice and the mechanism of production of the icterus (*Journal of Pathology and Bacteriology*, June, 1920). The spirochæte causing the disease was first found by Japanese workers in their own country. Since outbreaks of febrile, infectious jaundice have been frequent in past campaigns and in the barrack life of continental armies, it was not surprising that Stokes and Ryle were able to confirm the Japanese work in an outbreak among British troops in Flanders. Later, the presence of the disease in the French and German armies was fully established. The rat has been incriminated as a carrier of the spirochæte and an antispirochætal serum has been prepared which has a striking curative value. In Europe the death-rate is very low, certainly not over 4%. In Japan the case mortality has ranged up to 30%. No disease within the writer's own experience is more varied in the severity of its clinical manifestations and the pathological changes show similar gradations. This, taken along with the fewness of the post-mortem examinations, accounts for some diversity in description of the pathological findings in this disease. The writer has examined histologically the organs of five cases of the disease. In four the diagnosis was made certain by the positive inoculation of a guinea-pig. In the fifth case no guinea-pig was inoculated, but the histological lesions were such as to leave no doubt as to the diagnosis. The number of days after onset at which death occurs gives rise to considerable differences in the extent and variety of the lesions. The naked-eye appearances in the organs may be summed up generally as those of universal jaundice associated with hæmorrhages. The liver, while obviously jaundiced, was, in all the fatal human cases examined, of normal size, firm in section and free from any obvious fatty change. The organ, in fact, never bore the slightest resemblance to the liver of acute yellow atrophy. The hæmorrhages found in man, just as in the guinea-pig, were largest and most obvious in the lungs. Bleeding into the supra-renal bodies was noted in only one case. Smaller hæmorrhages were seen in various other situations, such as the pulp of the spleen, below the capsules of the kidneys and below the mucosa in various portions of the intestinal tract. The spleen was not enlarged in any of the five cases. The kidneys were always found to be firm and somewhat swollen, so that the capsules were tightly stretched. Histologically, the changes in the liver vary according to the severity of the case. In the most acute case (the patient died on the fifth day) the central portion of each lobule is completely disorganized. Many cells are entirely necrotic, and there is a large amount of débris, stained pink by eosin, evidently derived from the disintegrated cells. There is considerable cellular infiltration between the necrosed liver cells; more than half of the infiltrating cells are polymorphonuclear leucocytes, the remainder being lymphocytes. The outer third of each lobule is normal. Bile pigment is contained in many of the liver cells, but no biliary thrombi are to be recognized. In the three cases that ended fatally between the seventh and ninth days there is great dissociation of cells throughout the entire lobule, the intercellular cement substance being apparently destroyed. No necrotic changes are now visible, but are replaced by extraordinary evidences of regeneration. In the remaining case, probably a lighter infection, where, however, death occurred on the ninth day from intestinal hæmorrhage, the changes found in the liver are minimal in amount. The cells retain their normal position and there is no evidence of necrosis or regeneration. Abundant bile pigment is contained in the cells surrounding the radicles of the hepatic vein. No sign of fatty degeneration was found in any of the livers. In the kidneys the one change common to all is a striking necrosis of the cells of the tubules, especially the convoluted tubules. In two cases there was a frank hæmorrhagic nephritis with much bleeding into the capsules of Bowman and consequently into the tubules. In three of the cases there is evidence of interstitial change. Tissues of the organs in several of the acute cases were stained by Levaditi's method and a prolonged search made for spirochætes. In one case only were very scanty spirochætes found in the convoluted tubules of the kidney. The liver in every case gave a negative result. In control tissues from inoculated guinea-pigs spirochætes were found abundantly in the liver, kidneys and other organs. The mechanism of production of the jaundice has given rise to considerable discussion and divergence of opinion. The writer mentions the "obstructive" and "hæmolytic" theories, but thinks that in this instance we have to deal with a third variety of "intrinsic" or "toxic" jaundice, due to a true hepatitis with resulting functional derangement of the injured liver cells.

(149) Bacillus Tetani.

R. S. Adamson discusses at some length the cultivation and isolation of *Bacillus tetani* (*Journal of Pathology and Bacteriology*, June, 1920). During the course of an investigation of the anaerobic organisms present in septic wounds, a considerable number of anaerobic bacilli were isolated, but the presence of undoubted *B. tetani* was not demonstrable in any case. It could not be found in material from no less than nine patients who showed undoubted clinical symptoms of tetanus. In these cases not only was the bacillus not seen, but inoculations of animals from the mixed anaerobic cultures never produced the characteristic reactions. This observation made it obvious that special methods must be employed for the isolation of the organism. A preliminary difficulty when working with pure cultures is their great intolerance of even traces of oxygen. *B. tetani* appears to grow much more readily when mixed with small quantities of other organisms. Such mixtures grow in a symbiotic manner, even forming on plates what appear to be simple colonies. For the isolation of *B. tetani*, anaerobic culture in alkaline broth, —10 or —20, or aerobic culture in broth inoculated with *B. proteus*, has been found most satisfactory. For plating it is better to use agar with an alkaline than with an acid reaction. The mixed cultures should not be heated or subcultured, as both processes favour other anaerobes at the expense of *B. tetani*. Should the presence of the organism be suspected in a culture, an inoculation should be made into a guinea-pig. All isolated strains should be grown in neutral broth for four to eight days, and inoculations made. A strain which does not produce tetanic symptoms under these circumstances should not be accepted. Great care has to be exercised in obtaining and retaining a pure culture, especially as the organism grows much more readily when associated with small quantities of other bacteria. Pure cultures show remarkable uniformity in the thickness of the bacilli and in the length of the isolated examples. Any culture showing marked variation in size or staining reactions must be suspected and should be plated out and fresh cultures made from typical colonies. The best medium for toxin is neutral broth or slightly alkaline broth without the addition of glucose. For preserving strains in the laboratory for some time, alkaline —20 broth or stab cultures in alkaline —10 agar, have been found the most satisfactory. Such stored cultures are best sealed up. Good growths can be obtained aerobically with *B. proteus* and toxin can be prepared in this way without the necessity for any anaerobic apparatus.

(150) The Blood and Spleen in Variola.

In the *Canadian Medical Association Journal* (May, 1920) N. B. Gwyn relates his experience at the Toronto General Hospital in a recent epidemic of variola. Blood examinations revealed a normal or low leucocyte count in all cases but one, while in this one case the drop of the leucocytes during the fever wave was evident. Of particular interest was the case of a patient suffering from pernicious anæmia, in whom an abnormally low leucocyte count (2,200) was not increased during the whole of his pre-eruptive stage of variola. In two of the cases in which the condition of the spleen was investigated during the early stage, the spleen was enlarged and firm and presented a rounded edge. So marked was this enlargement in one case that the border could be felt during ordinary respiration. The firmness of the organ in a second case was like that felt in

malarial infections. In this case the fever, absence of backache and low leucocyte count had suggested typhoid fever, but the solid impression given by the spleen was noted as being an unusual manifestation in the early stage of typhoid fever.

PÆDIATRICS.

(151) Secondary Infections in Polio-Myelitis.

The occurrence of mixed infection constitutes a possible source of danger in the hospital treatment of all infective diseases. This was considered to be particularly acute in the hospitalization of patients with polio-myelitis during the 1916 epidemic in New York, when large numbers of children with this disease were admitted to hospital, at an age when they were most susceptible to the various infective maladies from areas where these diseases were prevalent. Certain symptoms, such as rashes of scarlatiniform type, heavily coated tongue, congested throat and occasional minute spots on the buccal mucosa which occur in poliomyelitis, cause confusion at first and a number of patients were isolated on account of suspicion of measles and scarlet fever. As the epidemic progressed, it was noted that secondary infections rarely developed after admission—only 15 or 0.83% of the total number admitted. These 15 cases included nine of pertussis, thre of diphtreia, one of measles, one of scarlet fever and one of varicella. No secondary cases occurred in the wards in which these cases appeared, though the majority of the children present were unprotected by previous attacks. Not only was mixed infection of polio-myelitis with other contagious diseases slight, but the number of patients admitted with double infections of this and some other infective process was also small—17 in all or 0.94‰. Thus out of a total of 1798 patients with polio-myelitis, there were only 32 who had, on admission or later, another disease, giving an incidence of 1.72%. Of these 32, there were 22 with pertussis. Deducting these cases, the incidence is reduced to 0.59%. From these facts and figures J. C. Regan (*Arch. of Pediatrics*, May, 1920) considers that children with polio-myelitis are not as susceptible to other contagious diseases as normal children with the possible exception of pertussis. This was the only infection prevalent among the polio-myelitis patients during the epidemic. This temporary relative insusceptibility may be based on certain fundamental principles of bacteriology. He assumes that infection with the virus of polio-myelitis induces certain changes in the tissues of the infected individuals, due possibly to products of the growth of the organisms, which render them unsuitable for the development of the causal agents of other acute infective processes. In other words, a condition of antagonism exists. The only germ which seems clinically to have a working relationship with that of polio-myelitis is the bacillus of whooping cough. The influence of polio-myelitis on the symptomatology of scarlet fever, varicella, diphtheria, morbilli and parotitis seems to be negligible with the one exception, that symptoms of the associated diseases are milder than usual. He states that the mortality-rate of these mixed infections was remarkably low, *viz.*, 3% compared to 23.79% in the uncomplicated polio-myelitis cases.

(152) Treatment of Pyelitis in Infancy and Childhood.

The excellent results obtained in the treatment of *Bacillus coli* infections in adults with silver nitrate injections into the renal pelvis tempted H. L. Kretchmer and H. Helmholtz (*Journ. of Amer. Med. Assoc.*, November 13, 1920) to try and apply that form of treatment to infants and children. In boys for anatomical reasons, cystoscopy and ureteral catheterization cannot be carried out as easily as in girls. After routine radiographic examination to exclude renal calculus and after routine examination of the urine (including guinea-pig inoculations) for tubercle bacilli, eleven patients were treated. The ages varied from seven months to ten and a half years and all the patients were girls. There were no untoward results or reactions following instrumentation and treatment. The objects being to render the urine free from pus and sterile, no patient was considered cured until these two requirements had been fulfilled. In nine of the eleven cases complete cures were obtained. One girl refused treatment after the first lavage and, as organisms were still present in her urine, she was not included amongst the patients cured, though pus was absent. Silver nitrate in 0.5% solution was used in each case. The amount injected varied from 1 c.cm. in infants to 5 c.cm. in older children. Three patients required only one injection before the urine became sterile; five patients required two injections and one required three injections. In two cases the renal urine became sterile before the vesical urine, in one case after two injections, in the other after the first injection. In the latter case a *Bacillus paratyphosus* infection was present and a subsequent examination a week later revealed a re-infection of the kidneys. In two cases there was regurgitation of bladder fluid into the renal pelvis during ureteral catheterization, while the surgeon was waiting to collect specimens from each kidney. This phenomenon occurred, however, only on the left side. In ten cases there was a pure culture of *B. coli*, in one *B. paratyphosus*. In all of the cases the pyelitis was bilateral; in none was there a bladder infection only.

(153) Naso-Pharyngeal Toxæmia.

At a meeting of the Royal Society of Medicine, A. Sellers and C. L. Lapage (*Proc. Roy. Soc. Med.*, Volume XIII., No. 9) expressed the opinion that naso-pharyngeal toxæmia was a very important disease in children. It was the cause of many symptoms, including anæmia and debility, with lassitude and impaired health, loss of appetite, headache, frequent colds, heart symptoms and signs (of which the condition corresponding to the disordered action of the heart of soldiers was the most frequent), symptoms and signs usually attributed to rheumatism (of which growing pains and tic or habit spasm were the chief) and nervousness and mental depression. Since the majority of the symptoms could be produced in the early stages of tuberculosis and since many of them could be produced by bad feeding, loss of sleep and unhygienic conditions, the diagnosis was often difficult. Examination of swabs from the naso-pharynx of patients with signs and symptoms of toxæmia showed that the average number of organisms was increased in many of the cases, indicating that a vicious circle might be established by some illness such as influenza, which had affected the naso-pharynx. The lowered general health allowed of more organisms and the large number of organisms lowered the general health. As regards vaccine treatment, it was difficult to isolate definitely from ordinary nasal swabs organisms which gave a clear indication for a specific vaccine. The bacteriology of the cases did not differ very materially from that of the naso-pharynx in a state of health or slight catarrh. As the result of treatment there was some evidence of a reduction in the number of bacteria.

(154) Cranial Hæmorrhage of the New-Born.

On a previous occasion J. A. Foote expressed the belief that an important factor in intracranial hæmorrhage occurring during or soon after birth, was the so-called hæmorrhagic tendency of the new-born. The free use of lumbar puncture and serum injections was suggested in all cases where intracranial hæmorrhage was suspected. He now reports (*Amer. Journ. of Dis. of Children*, July, 1920) seven cases of intracranial hæmorrhage observed in new-born infants during a period of 15 months. All showed within 24 hours of birth respiratory distress and cyanosis with or without muscular rigidity and twitching. Lumbar puncture yielded blood-stained fluid varying from a deep to a light claret colour and occasionally containing small clots. Both horse serum and thrombo-plastin were used hypodermically. Ten cubic centimetres were the amount injected, the horse serum being used in five cases. One child died; the remainder recovered. In only one case was lumbar puncture repeated. The six children appeared to be normal in every way on subsequent examination. These cases, because of the associated blueness and difficult breathing, are frequently confused with cases of atelectasis, cranial symptoms being absent or but slightly marked. The author urges the necessity for surgical and serum treatment in order to avert any after paralysis, though he admits that complete recovery may occur without treatment.

British Medical Association News.

SCIENTIFIC.

A meeting of the South Australian Branch was held in the Lister Hall, B.M.A. Buildings, Hindmarsh Square, Adelaide, on November 25, 1920.

Dr. R. H. Marten read a paper entitled, "Notes on a Case of Hydatid of the Heart," and Dr. C. T. C. de Crespigny contributed the pathological report (see *The Medical Journal of Australia*, April 9, 1921, page 287).

Dr. H. K. Fry read a paper on the "Pathology of Functional Nervous Disorders" (see page 325).

Dr. J. V. McAree said that he had listened with much interest to Dr. Fry's able paper. He mentioned the case of a young man who had recently sought his assistance because he was abnormally bashful, morose and retiring in his habits. The reflex working of the brain without consciousness was well exemplified in this case. The patient had stated that he had met with an accident at school at the age of twelve years. He remembered nothing of what happened during that day. On the following day he regained full consciousness, but there was complete amnesia for the period of unconsciousness. In the hypnotic state he remembered everything. He recalled, among other things, that he had interfered with the tools of some workmen and that they had sworn at him. From that time he had become unsocial. Dr. McAree had explained to the patient, both in the waking and in the hypnotic states, that it was the unconscious fear of further violence from his companions that had made him a hermit. The effect of the rough words on his highly plastic brain had made him irritable. He had become practically normal, had lost his bashfulness and even made a speech in public for the first time.

Dr. McAree expressed his views concerning the mechanism of functional disorders, especially involving the sexual sphere. He held that sodomy not infrequently started as a result of the action of an unscrupulous nursemaid. Sexual gratification in this case travelled along a secondary reflex path and, as was the case of the habitual masturbator, no gratification occurred through the normal reflex path. Tickling produced laughter in a modest virgin, because, instead of an erotic feeling being produced, as was natural, the impulse was switched on for safety and laughter was the result. When modesty was not prominent, or when the woman was married, ticking was not felt as much, but an erotic feeling was produced. Dr. McAree held that this formed an important test for virginity. He stated that a person could not tickle himself, because of the absence of sexual significance.

Dr. Humphrey Marten showed a fibroid uterus which had been removed from a lady aged 63 years. At the time of the operation the tumour was giving rise to intestinal obstruction. She had weighed 108 kilograms, but as a result of an attack of glycosuria, her weight had fallen to 70 kilograms. At the time of the operation her urine was free of sugar and had remained so since. The tumour weighed 6,350 grammes. Her recovery had been uneventful.

Dr. Marten also exhibited the heart of a returned soldier who had been a prisoner of war in Germany for a period of eighteen months. He had received an injection on the day of his release. He had been unaware of the nature of the substance injected. His health had deteriorated from that time. He had been under the care of Dr. de Crespigny and also of Dr. Marten. His symptoms had been due to anæmia and valvular lesions. There had been no fever. His blood had contained a streptococcus.

The undermentioned have been elected as members of the New South Wales Branch:

A. E. Allum, Esq., M.B., Ch.M., 1920 (Univ. Sydney), Sydney Hospital.

H. M. Armstrong, Esq., M.B., 1920 (Univ. Sydney), Coast Hospital, Little Bay.

R. G. Arnott, Esq., M.B., Ch.M., 1920 (Univ. Sydney), Canowindra.

H. M. Cutler, Esq., M.B., Ch.M., 1920 (Univ. Sydney), "Vineta," Woolwich Point.

G. H. Hair, Esq., M.B., Ch.M., 1919 (Univ. Sydney), Forbes.

N. E. McLaren, Esq., M.B., Ch.M., 1920 (Univ. Sydney), Sydney Hospital.

A. I. G. McLaughlin, Esq., M.B., Ch.M., 1920 (Univ. Sydney), Sydney Hospital.

J. D. Maude, Esq., M.B., Ch.M., 1920 (Univ. Sydney), Sydney Hospital.

W. T. Maxwell, Esq., M.B., Ch.M., 1920 (Univ. Sydney), Sydney Hospital.

P. M. O'Reilly, Esq., M.B., Ch.M., 1920 (Univ. Sydney), Sydney Hospital.

L. J. A. Parr, Esq., M.B., Ch.M., 1920 (Univ. Slydney), Sydney Hospital.

L. J. Scott, Esq., M.B., Ch.M., 1920 (Univ. Sydney), The Hospital, Rydalmere.

H. R. Scrivener, Esq., M.B., Ch.M., 1920 (Univ. Sydney), Sydney Hospital.

J. E. Sherwood, Esq., M.B., Ch.M., 1920 (Univ. Sydney), Sydney Hospital.

Walter Jaques Stack, Esq., M.B., 1914, Ch.M., 1920 (Univ. Sydney), Molong.

R. E. Weaver, Esq., M.B., Ch.M., 1920 (Univ. Sydney), Lewisham Hospital.

W. K. W. Flook, Esq., M.B., 1916 (Univ. Sydney), Mendooran.

Eric Herbert Pike, Esq., M.B., Ch.M., 1921 (Univ. Sydney), 62 Liverpool Road, Summer Hill.

James Tatham Jefferis, Esq., M.B., Ch.M., 1921 (Univ. Sydney), "Somerton," Badmington Road, Croydon.

Cecil Stuart Bull, Esq., M.B., Ch.M., 1921 (Univ. Sydney), "Carthona," Lyons Road, Drummoyne.

The undermentioned has been nominated for election as a member of the New South Wales Branch:

Arthur Raphael Steven, Esq., M.B., Ch.B., 1916 (Univ. Glasg.), Hillcrest Avenue, Gladesville.

The undermentioned have been elected as members of the Victorian Branch:

Edward Percy Oldham, Esq., M.B., Ch.B., 1907 (Melb.), Mansfield.

Waldron Keith Davenport, Esq., M.B., B.S., 1920 (Melb.), St. Kilda.

Miss Jean L. Reid, M.B., B.S., 1920 (Melb.), Queen Victoria Hospital.

THE DEAF AND DUMB AND THE BLIND IN NEW SOUTH WALES.

The New South Wales Institution for the Deaf and Dumb and the Blind has become practically known to members of the New South Wales Branch of the British Medical Association within recent years by the fact that its gifted Superintendent, Mr. Harold Earlam, has on two occasions demonstrated his methods of educating the deaf at meetings of the Branch. The medical profession has a large responsibility in regard to the care and training of both deaf mutes and blind children. Moreover, in the realm of preventive medicine there should be adequate provision made for the prophylaxis of both conditions in children.

In the New South Wales Institution the members of the honorary visiting medical staff work hand in hand with the teachers in the blind school and in the deaf school. From the annual report published a short time ago we learn that there were on September 30, 1919, 87 deaf and dumb and 32 blind children undergoing training. During the course of the year 21 deaf mutes and nine blind children were admitted. In addition to these classes there is the extraordinary child Alice Betteridge, who, notwithstanding the afflictions of deafness and blindness, is stated to be the best educated child in the school. Of the 150 children dealt with during the year, 90 were boys and 60 girls. During the course of the twelve months 23 children (18 boys and 5 girls) were withdrawn, in some cases after the completion of the schooling.

The Superintendent calls attention to the fact that in January, 1920, the Institution was re-opened for its essential purposes. It will be remembered that during the scare of the influenza epidemic the educational activities in this establishment had been interrupted. The re-opening of the schools was by no means the easy task of an ordinary

resumption. A long period of inactivity necessarily renders the task more difficult for both teacher and blind or deaf pupil when the lessens are re-started. Mr. Earlam had an additional difficulty to meet caused by the resignation during the interval of two experienced teachers. He had also to make provision for an unusually large number of new pupils. The average age of the deaf children on admission was nearly nine years and of the blind children nearly nine and a half years. Mr. Earlam points out each year the serious handicap involved by a late beginning of the education of these afflicted children. In some cases the children are removed from the school after a relatively short period of training. The remedy for which he clamours, is the application of the compulsory school attendance to the blind and to deaf mutes.

He records gratifying progress in all the classes of the blind school. The children are happy and contented, learn their lessons in a very creditable manner and show much ability in their manual work. Mr. Earlam is satisfied with the manner in which the children are learning to play the piano and to sing.

He states that Alice Betteridge, the deaf-blind pupil, has made remarkable progress both intellectually and in her manual work. The scope and range of her ability have been greatly extended. He congratulates her teacher on a wonderful achievement. The Inspectors from the Department of Public Instruction endorse this opinion.

In the deaf school both the habitual difficulties and the temporary ones were overcome soon after the resumption of the school and satisfactory progress has been made throughout. Mr. Earlam states that he knows of no school which produces a more healthy and normal type or whose pupils are better fitted to face the world and to hold their own in life's struggle. He has been at great pains to balance the educational work with the manual training and to give adequate time and encouragement to play. Not without pride he recalls the fact that the deaf boys won eleven cricket matches out of fourteen and thirteen football matches out of twenty. He speaks in the highest terms of the experienced teachers who have contributed so much to the success of his undertaking. In reference to the instruction on speech-reading of returned soldiers undertaken at the instigation of the Vocational Committee of the Department of Repatriation, he points out that all the male teachers had associated themselves with him in this voluntary service and had willingly sacrificed time and energy for the benefit of those who had returned from the war with the heavy disability of deafness.

The report of the Inspectors is a sympathetic document, full of praise for the admirable work of this Institution. From the financial statement we gather that the upkeep of the Institution costs approximately £8,800 in the year. The sum of just under £3,500 is derived from subscriptions and donations. The Government subsidy amounts to £450.

Hospitals.

THE MELBOURNE HOSPITAL.

The annual report of the Committee of Management of the Melbourne Hospital for the year ended June 30, 1920, was issued a short time ago in book form, with the usual addenda.

The Committee pleads earnestly for the means to enlarge the hospital and to increase its accommodation for patients. It is pointed out that the number of beds available are insufficient for the persons seeking admission, that for many months the only patients who could be admitted to the surgical wards were those most urgently requiring operative treatment. Not only are additional wards required for an ever-increasing number of patients; additional accommodation for nurses must also be provided, in order that any new wards could be adequately staffed. An appeal is made, both to the governors and to the public, for assistance and to the State Treasurer for a special grant in addition to the annual subsidy.

The total number of patients admitted during the year was 6.588, including 133 who were re-admitted during the year. There were 357 patients in the hospital on the first day of the year and 356 on the last. The number of those discharged was 5,666 and the number of deaths was 923, of which 221 took place within 48 hours of admission. The inclusion of persons admitted twice during the year among the number of admissions, without any indication of the fate of these persons, is unfortunate. It is, however, possible from the figures given to calculate the actual number of persons discharged and consequently the mortality rate as expressed in the usual manner. It works out at just under 14.3% and not 13.2%, as stated in the table. The average duration of residence in the hospital was 20 days, while the average number of patients in the wards was 379. It is stated that on November 26, 1919, as many as 420 patients were accommodated. We note that in the body of the report the statement is made that 144 patients were re-admitted during the year, while in the statistical table the number is given as 133.

In the Out-patient Department, 16,430 persons received treatment, while in the Casualty Department 18,108 patients were dealt with. The total number of operations is given as 4,809. If it can be assumed that no patient was subjected to more than one operation and that the operations performed in the Out-patient Department are not included in the list, it would follow that 70.5% of the patients admitted to the wards underwent an operation. The anæsthesia employed for the 3,891 operations was by ordinary inhalation in 3,147 instances, by the intratracheal method in 102, by means of the Junker apparatus in 56, by rectal administration in seven and through a tracheotomy tube in two. Ether was used either alone or in conjunction with ethyl-chloride of chloroform 2,926 times, while chloroform was used either alone or in conjunction with ethyl chloride or ether 379 times. Local anæsthesia was used for 577 operations. There were three deaths under general anæsthesia.

A very considerable increase in the amount of work conducted in the X-ray Department is recorded. In the year 1914 2,476 examinations were undertaken, while in 1920 the number was increased to 7,093. It is stated that steps were being taken for the purpose of securing a new X-ray installation. Dr. Clendinnen had been asked to negotiate the purchase of the apparatus in America.

A report is appended from the Pathological Department, in which the total number of specimens examined, etc., are set forth. As the details in the report are not correlated with clinical findings, its practical significance is small. In another part of the report reference is made to the fact that the Walter and Eliza Hall Institute of Research in Pathology and Medicine was in full working order. Dr. S. W. Patterson had entered upon his duties as Director during the course of the year and his staff consisted of Dr. N. Hamilton Fairley and Miss F. E. Williams. Dr. P. A. Stevens joined a little later as the Cancer Research Student.

Several changes in the personnel of the medical staff took place during the year under review. Sir Henry Maudsley resigned his position as Honorary Physician and was elected Consulting Physician on December 16, 1919. He had held the former position for a period of over sixteen years. Mr. G. A. Syme resigned his position as Honorary Surgeon on July 13, 1919, after having held it for a period of sixteen years. He was elected Consulting Surgeon. Dr. C. V. Mackay resigned the position of Honorary Physician to Out-Patients in December, 1919. In addition, Dr. G. L. Laycock, Dr. G. W. Armstrong, Dr. R. M. Downes, Dr. M. D. Silberberg and Dr. W. E. Summons retired from their positions as Medical Electrician, Clinical Assistant to the Dermatologist, Surgical Clinical Assistant and Medical Clinical Assistants respectively. The following were appointed to vacant positions: Mr. B. T. Zwar as Surgeon to In-Patients, Dr. R. R. Stawell as Physician to In-Patients, Dr. R. P. McMeekin as Physician to Out-Patients, Dr. F. Blois Lawton as Physician to Out-Patients and Mr. W. Allan Hailes as Surgeon to Out-Patients. Dr. McMeekin resigned his office as Medical Superintendent, which he had held since June, 1916. Dr. Mervyn A. Stewart was appointed to the vacant position on April 1, 1920.

The number of students attending the Hospital was 220. On the recommendation of the honorary medical staff, the Faculty of Medicine sanctioned the appointment of Mr. Victor Hurley as Sub-Dean of the Melbourne Hospital Clinical School.

The Committee of Management have a sad story to tell of the financial embarrassment of the institution. The expenditure on maintenance exceeded the income by £7,719,

notwithstanding the fact that private and other contributions were larger than in any previous year. The total income amounted to £50,530, of which the Government contributed £17,500, the charitable public £11,780, the patients £10,829, visitors (in the form of fees) £1,439 and the students £860. The expenditure amounted to £58,249. As the average number of patients in the Hospital was 379.5, the cost of maintenance per patient per week works out at £3 1s. 8½d..

Obituary.

WILLIAM STUART HAWTHORNE.

William Stuart Hawthorne, whose death was announced in *The Medical Journal of Australia* of March 26, 1921, was born at Leichhardt, Sydney, on February 9, 1888. He attended the Sydney High School. In due course he entered the Medical School of the Sydney University. His amiable character, fine physique and *bonhomie* at once secured popularity for him among his comrades. His teachers, too, formed a high opinion of his ability and this high opinion he justified throughout his student life and his short career as a medical practitioner. He graduated in 1915. The ink on his degree was scarcely dry when he travelled overseas as one of the selected band of young Australian graduates who had been called to take up service with the Royal Army Medical Corps. During the remainder of the year 1915 and throughout 1916 he was attached to the 9th Royal Welsh Fusiliers. He rendered most valuable service and contributed not a little to the fine reputation which Australian citizens created as sons of the Empire. At the end of 1916 he returned to Australia and with indomitable energy immediately offered his services in the Australian Imperial Force. He was sent at first to the Military Hospital at Kangaroo Point, Brisbane. After a few months' home work he left in May, 1917, for France, to serve as a Regimental Medical Officer with the 53rd Battalion of the Australian Imperial Force. He was severely gassed at Villers Brettoneux during the German offensive of March, 1918. His recovery from the effects of the poison was not complete. Later, he was attached to the staff of the Acting Director Medical Services at the headquarters of the Australian Forces at Tidworth. In January, 1919, he returned to Australia, but while on board the transport he contracted enteric fever. On arrival at Fremantle he was taken ashore and transferred to the Perth Public Hospital.

After his discharge from the Australian Imperial Force he came to the assistance of the Department of Public Health of New South Wales and gave strenuous service during the influenza epidemic. His willingness to help and his utter disregard of self outweighed wisdom, for he was certainly not strong enough or well enough for the heavy duties of that time. His keen desire to put his utmost energy into his every undertaking cloaked his physical disability. Later, when assistance was required in Tasmania during the outbreak of influenza there, he again undertook service and worked hard and well in Hobart.

In January, 1920, he commenced practice at Murrayville, in the north of Victoria. He continued in practice until shortly before his death, which took place on March 13, 1921. He is survived by a widow and a young daughter, with whom his many comrades and friends sympathize.

Correspondence.

THE OCCURRENCE OF HYMENOLEPIS DIMINUTA IN AUSTRALIA.

Sir: In an article entitled "Medical Information in the Lay Press" in your issue of April 2, there is a criticism of certain inaccurate statements made in an evening newspaper. In your own article, however, two species of tapeworm are confused. The newspaper mentions a report which I made to the Board of Health of the discovery of *Hymenolepis diminuta* in an infant and recorded in your *Journal* last year and infers wrongly that *Hymenolepsis nana* has not been found in Australia.

Your article states that: "It is quite untrue that this worm (*i.e., H. nana*) has only been found once in man in Australia," but the newspaper did not say this of *H. nana*, but only of *H. diminuta*. If you are aware of any record prior to mine of the occurrence of *Hymenolepis diminuta* in man in Australia I would be glad to hear of it.

Yours, etc.,

CHARLES BADHAM.

Kendall, North Coast,
New South Wales,
April 7, 1921.

"THE GAUZE PACK" METHOD.

Sir: It is not at any time a very difficult matter to throw cold water on an honest effort at progress, but in doing so one should at least be consistent.

In his letter in your issue of April 2, 1921, Dr. J. W. Sutherland demands of Dr. J. Forbes Mackenzie more convincing data to support his condemnation of the practice of urethral irrigation, yet Dr. Sutherland tersely condemns the gauze pack method with no more convincing data than that: "He had asked several returned men about it and none had a good work to say for it." I take it he refers to returned medical officers. Is Dr. Sutherland aware of the fact that, apart from the efforts of imperfectly trained orderlies, there were not "several" medical officers who ever packed a urethra whilst on active service and I am sure there was only one who applied the method to a sufficient number of cases to be competent to judge its value and he happens to be still using it.

I would humbly suggest to Dr. Sutherland that he give the method a trial and then let us have his scientific reasons for condemning it and not what he may have heard from those who may not know.

Yours, etc.,

J. P. FOGARTY.

Kew, Melbourne,
April 9, 1921.

PSYCHIC RESEARCH.

Sir: The lectures on "spiritualism" given by Sir A. Conan Doyle, during his recent visit to Australia, appear to have evoked much interest in the subject among all classes of the community, judging by the number of psychical research societies which have been formed since, and my object in writing this letter is to urge upon medical practitioners the duty which they owe to their patients of being able to speak with first hand knowledge, if possible, on the genuineness or otherwise of the alleged phenomena and the validity of the evidence obtainable respecting the continued existence of the human consciousness after the death of the physical body and the possibility of that consciousness being able to communicate with living individuals, and give proof of its identity with the consciousness of a person known to them when it was living in the physical body during its earth life.

The leading article which appeared in *The Medical Journal of Australia*, dated November 27, 1920, on "Paranoia and Occultism," warns medical practitioners of the injury which may accrue to those whose mental balance may have been affected by the incidents of the war by spiritualism; but in order to guard a patient against injurious results from this cause a knowledge of the subject is imperative, and this knowledge can only be obtained from first-hand experience, that gained by reading not being of any practical value in convincing others, especially those who have had, what they consider, positive proof of the continued existence of the consciousness of the loved ones who have died. Nor would it be advisable to try to upset a belief which has brought peace and comfort to bereaved individuals, for it cannot be denied that spiritualism, in this respect, has been a God-send to a great many thousands thirsting for proof of the continued existence of those that they have regarded as lost to them for ever. It behoves the medical practitioner to act in such cases with that discrimination and judgement which can only be exercised by having investigated the subject of spiritualism practically, before he can class any of such people as paranoiacs.

Unfortunately, we have too much evidence on the part of many adverse critics of psychic phenomena of the existence of that principle which Dr. Paley says: "Is a bar to all in-

formation, which is proof against all argument and which cannot fail to keep a man in everlasting ignorance and that principle is contempt prior to examination." Contempt of hypnotism and psycho-therapy has done much in the past to weaken the influence of the medical profession with the public; let the profession, then, not lag behind in the pursuit of that greatest of all questions, the continuance of the human consciousness after the dissolution of the physical body and the possibility of its communicating with an embodied consciousness.

The term "spiritualism" is wrongly used in this connexion. We are dealing with the consciousness of the human being, the real man, and it is the same consciousness whether embodied or disembodied, for consciousness is the only reality.

"Consciousness is, and there is nothing but consciousness. All matter is a manifestation of the one consciousness and every atom of matter is a separate manifestation or expression of consciousness as a whole, not a separate part of consciousness. There are no different phases of consciousness, but different phases of manifestation or expression of the one, indivisable, immutable, universal, eternal, omnipotent, omniscient consciousness," which Christians call God; Jews, Jehovah; Hindus, Brahm; Greeks, Theos; French, Dieu; and so on, each race having its own name for the one, absolute, all consciousness.

The word "spirit" should be confined to consciousness unmanifest—man's real self—which is God himself. Man, therefore, is as much a spirit when functioning in a physical body on the physical plane, as he is when functioning on the next or astral plane, in an astral body, after leaving his physical body permanently at its death. The term "spirits," then, as applied to discarnate entities by spiritualists, is erroneous and misleading, and should be dropped and the words "psychic research" substituted for the word "spiritualism."

As I cannot pursue this subject further at this time without trespassing unduly on your valuable space, I will gladly forward a copy of my pamphlet entitled "Experience in Psychic Research" to any of your readers on receipt of name and address.

Yours, etc.,

W. F. TAYLOR.

Preston House,
Queen Street,
Brisbane.
April 9, 1921.

SETTLEMENT OF TROPICAL AUSTRALIA.

Sir: Dr. Breinl's paper in your last issue recalls to one that the time has come, in fact, is overdue, for some plain speaking about the discussion at the recent Medical Congress on the settlement of tropical Australia.

I must admit that I find it difficult to review in retrospect the whole of the proceedings connected with the discussion in as temperate a manner as the subject demands. Along with many others, I had looked forward with much interest and anticipation to the consideration of this question at the Brisbane Congress. The fact that it was to be the principal subject for discussion had been announced for years beforehand and in my simplicity I imagined that in a matter of such incalculable importance to the Commonwealth, the fullest opportunity would be given for examining the question in all its bearing and that all who could possibly throw any light on the subject, would be encouraged to do so. I had dreams of a round table conference of all who had devoted time and study to the question which should begin on the first day of the Congress and continue—if need be—right through till the end. All those who were at the Congress know that what really took place was this: This much-boomed subject was relegated, as of little or no significance, to the last day and actually to the last afternoon session of the Congress! In the morning of that day I discovered that certain printed resolutions which were to be submitted in the afternoon and which appeared to me to be highly contentious, had come into the hands of the pressmen present. I drew attention to this, as I felt convinced that these resolutions would be wired or mailed all over Australia even before they were considered in the afternoon and would be accepted as the conclusions the Congress had arrived at. One of the Congress officials indignantly denied that the press had had access to the resolutions, but courteously apologized to me afterwards when he found that I was right.

In the afternoon, some time after 2 p.m., the meeting started with those present who were not tired or blasé from the week's work, or had not gone off golfing or motoring. Four papers were read which occupied the time, as far as I can remember, until between 3.30 and 4 p.m.. By then some of those present were getting bored and left. Those who elected to speak, were allowed ten minutes each, but most of the speakers did not avail themselves of their time allowance, as an atmosphere of "get it over" began to develope in the audience.

I had some matter which I believed to be of value collected from various parts of the world since I read a paper on the subject at the Melbourne Conference in 1908, but there was no time to make use of it and other speakers with local knowledge were in the same position. Finally before the vote on the resolutions was taken, I sought by an amendment to have the decision on them postponed till the next Congress, but this was rejected and these *ex cathedra dicta* which I felt then and still believe were not justified by the evidence brought forward, were carried by a majority of the minority of those present at the beginning of the meeting.

A day or two later all the newspapers of Australia were appearing with editorials announcing to a credulous public that the problem of tropical Australia had been settled once and for good. All the doubts and fears had been dissipated. Tropical Australia had been proved to be not tropical at all and it only remained to persuade the Anglo-Saxon to enter into this "Land of Promise" and multiply and replenish the earth there.

I have not attempted to deal with the question of the permanent settlement of northern Australia, though much could be said upon it. What I wish to draw attention to is that this so-called conference was not a conference in the accepted sense of the term and that the public were misled with regard to its significance. I cannot escape the conviction that the whole thing was what would be called in vulgar parlance "a put-up job" and that the ready-made resolutions were framed without any regard for the subsequent discussion. Such procedure may be satisfactory to those responsible for it, but it seems to me to be neither scientific nor in accordance with common sense and reason.

Yours, etc.,

RICHARD ARTHUR.

Sydney,
April 18, 1921.

COMPULSORY TRAINING IN THE CITIZEN FORCES.

Sir: In your leader is the issue of April 9, 1921, you make the following suggestions:

"That the Commonwealth Government be asked to amend the *Defence Act*, so as to provide for the exemption of all undergraduates in medicine from service with the Citizen Forces at the prescribed age and for compulsory enrolment of every physically fit medical practitioner within one year of graduation in the Defence Medical Service. The period of training would be the same as that prescribed for ordinary service in the Citizen Forces."

I think that the following scheme of training is better than the one outlined above:

Medical students should do three years in the University Scouts, to be trained as soldiers—to learn discipline and the conditions under which the fighting units work. Then the last two years of medical course should be spent in the Army Medical Corps. For this training a field ambulance should be established at the University. With the above training medical students would pass through the ranks of both infantry and Army Medical Corps and could qualify for commissioned rank in the Army Medical Corps just prior to graduation.

The Army Medical Corps officers, after the five years' training at the University, would be well trained from a military point of view and able to go on parade with any unit with confidence; each year would make them more competent from a medical point of view.

The junior officers for the field ambulance at the University could be drawn from the resident medical officers of the metropolitan hospitals, whilst the senior officers could be drawn from the teaching staff of the medical school and hospitals.

The pre-war system of medical men receiving a commission when they possessed practically no military training frequently placed the new officer in embarrassing positions. Who does not remember the anxiety of entering the barrack gates with a brand new uniform on and commissioned rank and wondering whom one should or should not salute?

Yours, etc.,

ARCHIE ASPINALL.

175 Macquarie Street, Sydney,
April 12, 1921.

[Dr. Aspinall's proposal is better than that referred to in the leading article in our issue of April 9, 1921, provided that the senior student is drafted into the proposed "Defence Medical Services" and not the Army Medical Corps.—Ed.]

Proceedings of the Australian Medical Boards.

NEW SOUTH WALES.

The undermentioned has been registered under the provisions of the *Medical Act, 1912 and 1915*, as a duly qualified medical practitioner:

Oliphant, Marie Claire, M.B., 1920, Univ. of Sydney.

The following additional qualifications have been registered:

Ellis, Oswald J., F.R.C.S., Edin., 1920.
Yuille, Max, F.R.C.S., Edin., 1920.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xxiii.

Department of Defence: Director General Army Medical Services.

Department of Defence: Medical Officer for the Central Flying School, Laverton, Victoria.

Alfred Hospital, Melbourne: Clinical Assistant to Out-Patient Surgeon.

Department of the Navy, Melbourne: Four Medical Officers.

Sydney Hospital: Honorary Director of the Department of Special Therapeutics.

Benevolent Society of New South Wales: (1) Honorary Ophthalmic Surgeon of the Royal Hospital for Women, Sydney. (2) Senior Resident Medical Officer of the Renwick Hospital for Infants, Sydney.

Alpha District Hospital, Queensland: Medical Officer.

Medical Appointments.

IMPORTANT NOTICE.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429 Strand, London, W.C.

Branch.	APPOINTMENTS.
NEW SOUTH WALES. (Hon. Sec., 30-34 Elizabeth Street, Sydney.)	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIA. (Hon Sec., Medical Society Hall, East Melbourne.)	All Institutes or Medical Dispensaries. Manchester Unity Independent Order of Oddfellows. Ancient Order of Foresters. Hibernian Australian Catholic Benefit Society. Grand United Order of Free Gardeners. Sons of Temperance. Order of St. Andrew. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
QUEENSLAND. (Hon. Sec., B.M.A. Building, Adelaide Street, Brisbane.)	Australian Natives' Association. Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIA. (Hon. Sec., 3 North Terrace, Adelaide.)	Contract Practice Appointments at Renmark. Contract Practice Appointments in South Australia.
WESTERN AUSTRALIA. (Hon. Sec., 6 Bank of New South Wales Chambers, St. George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND: WELLINGTON DIVISION. (Hon. Sec., Wellington.)	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

Apr. 26.—N.S.W. Branch, B.M.A., Medical Politics Committee; Organization and Science Committee.
Apr. 27.—Vic. Branch, B.M.A., Council.
Apr. 28.—S. Aust. Branch, B.M.A..
Apr. 29.—N.S.W. Branch, B.M.A..
May 4.—Vic. Branch, B.M.A..
May 6.—Q. Branch, B.M.A..
May 10.—Tas. Branch, B.M.A..
May 10.—N.S.W. Branch, B.M.A., Ethics Committee.
May 11.—Melb. Pædiatric Society (Vic.).
May 12.—Vic. Branch, B.M.A., Council; Election of Representative on Representative Body.
May 13.—N.S.W. Branch, B.M.A., Clinical.
May 13.—Q. Branch, B.M.A., Council.
May 13.—S. Aust. Branch, B.M.A., Council.
May 17.—N.S.W. Branch, B.M.A.; Executive and Finance Committee.

EDITORIAL NOTICES.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned.

Original articles forwarded for publication are understood to be offered to *The Medical Journal of Australia* alone, unless the contrary be stated.

All communications should be addressed to "The Editor," *The Medical Journal of Australia*, B.M.A Building, 30-34 Elizabeth Street, Sydney. (Telephone: B. 4635.)